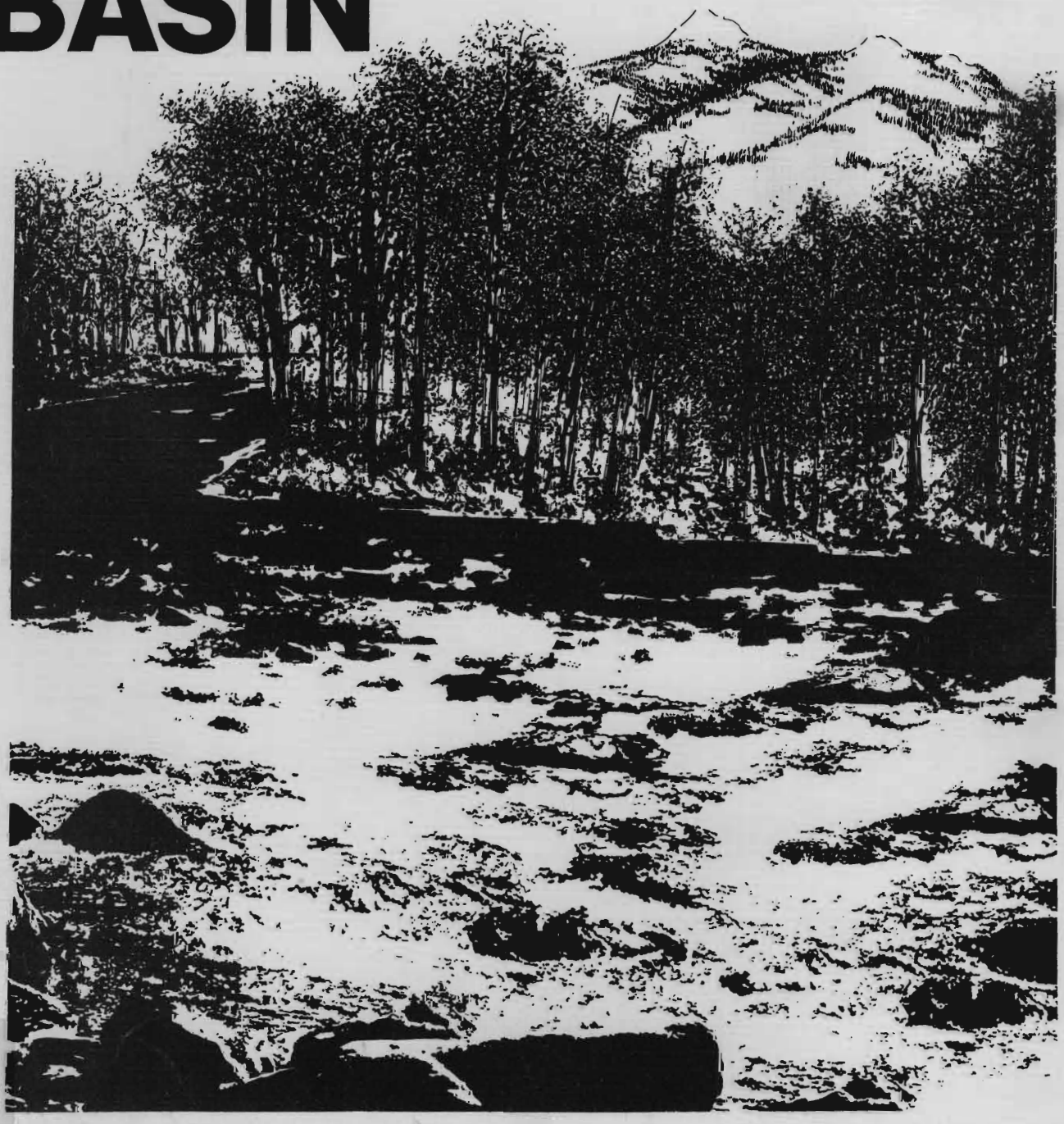
UPPER CLARK FORK BASIN

WATER RESERVATION APPLICATIONS



Final Environmental Impact Statement

FINAL

ENVIRONMENTAL IMPACT STATEMENT FOR WATER RESERVATION APPLICATIONS IN THE

UPPER CLARK FORK BASIN

January 1991

Montana Department of Natural Resources
and Conservation

CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS

af	--	acre-feet
AMC	--	Anaconda Mining Company
ARCO	--	Atlantic Richfield Company
ARM	--	Administrative Rules of Montana
ASCS	--	Agricultural Stabilization and Conservation Service
AUM	--	animal unit month
BHES	--	Montana Board of Health and Environmental Sciences
BLM	--	United States Bureau of Land Management
Board	--	Montana Board of Natural Resources and Conservation
BOD	--	biological oxygen demand
BPA	--	Bonneville Power Administration
cfs	--	cubic feet per second
COD	--	chemical oxygen demand
DFWP	--	Montana Department of Fish, Wildlife and Parks
DHES	--	Montana Department of Health and Environmental Sciences
DNRC	--	Montana Department of Natural Resources and Conservation
DSL	--	Montana Department of State Lands
EIS	--	environmental impact statement
EPA	--	United States Environmental Protection Agency
FEMA	--	Federal Emergency Management Agency
FERC	--	Federal Energy Regulatory Commission
GCD	--	Granite Conservation District
kv	--	kilovolt
kWh	--	kilowatt-hour
MCA	--	Montana Codes Annotated
MEPA	--	Montana Environmental Policy Act
mg/l	--	milligrams per liter
MNHP	--	Montana Natural Heritage Program
MNRIS	--	Montana Natural Resources Information System
MPC	--	Montana Power Company
MRI	--	Montana Resources Incorporated
TDS	--	total dissolved solids
TSS	--	total suspended solids
µg/l	--	micrograms per liter
USBR	--	United States Bureau of Reclamation
USDA	--	United States Department of Agriculture
USDI	--	United States Department of the Interior
USFS	--	United States Forest Service
USGS	--	United States Geological Survey
WWP	--	Washington Water Power Company

CHAPTER ONE

INTRODUCTION

In December 1988, the Department of Natural Resources and Conservation (DNRC) released the draft environmental impact statement (EIS) on the upper Clark Fork basin water reservation applications. The draft EIS examines water reservation requests from the Granite Conservation District (GCD) and the Montana Department of Fish, Wildlife and Parks (DFWP). GCD is seeking a water reservation on the North Fork of Lower Willow Creek to supply water to supplement irrigation on 2,900 acres of land west of Hall. This project would require a new dam upstream from the existing Lower Willow Creek reservoir. DFWP is requesting reservations to maintain instream flows on the main-stem Clark Fork and 17 tributaries above Milltown Dam for the protection of fish, wildlife, and recreation and to maintain dilution flows for water quality purposes.

Following publication of the draft EIS, the public was given 90 days to comment. DNRC held public meetings in Drummond, Deer Lodge, and Bonner in January 1989, and written comments were accepted until March 16, 1989.

A second reservation request for water on Boulder Creek had been included in GCD's original application (1987), but was omitted from the draft EIS on the basis of a meeting between GCD and DNRC in the spring of 1988. In July 1989, the GCD board chairman sent a letter to DNRC stating GCD's intent to pursue the Boulder Creek proposal, necessitating an addendum to the draft EIS. The addendum was published in March 1990, and examines GCD's proposal to reserve water on Boulder Creek to irrigate 4,093 acres of land southeast of Hall. This project would require a new dam on Boulder Creek. The public comment period of 30 days was extended 15 additional days. A public meeting was held in Drummond on April 4, 1990, and written comments were accepted until May 1, 1990.

This final EIS summarizes, updates, and revises the draft and addendum in response to the 490 written and oral comments received. New and additional information is presented to clarify the analyses contained in the draft EIS and addendum. Some of this information was not available when the draft and addendum were prepared. Written and oral comments are presented with DNRC's responses in Chapter Four. The final EIS does *not* contain recommendations from DNRC to the Board of Natural Resources and Conservation (Board) regarding action on the pending water reservation applications. The decision of whether to grant, modify, or deny a reservation rests with the Board, not DNRC, and will be made after a contested case hearing is held to receive testimony from the applicants and objectors. When deliberating on each reservation application, the Board will rely on information from the application, the draft and final EISs, and evidence presented at the contested case hearing.

Notice of the contested case hearing will be served by first-class mail upon all water right claimants and permittees of record in the upper Clark Fork basin and other persons that may be affected by the proposed reservations. Legal notice will be published in local newspapers, and news releases will also be sent to the newspapers.

Any affected person can participate in the hearings process, either by presenting public testimony without filing an objection or by filing a formal objection to a water reservation application. The notice of the contested case hearing will describe the procedure for participating.

CHAPTER TWO

SUMMARY OF THE DRAFT EIS AND ADDENDUM

BOARD DECISION CRITERIA

The draft EIS and the addendum to the draft present DNRC's analyses of the environmental impacts of granting or denying GCD's and DFWP's requests for water reservations in the upper Clark Fork basin. The decision of whether to grant or deny these reservations rests with the Board, which must abide by the following criteria for granting a reservation.

Qualifications and Purpose

The Board must find that the applicant is qualified to reserve water and that the purpose of the reservation is a beneficial use (§ 85-2-316(1) and 85-2-316(4)(a)(i), MCA; ARM 36.16.107B(1)).

Need

The Board must find that the reservation is needed (§ 85-2-316(4)(a)(ii), MCA). A reservation is needed if "there is a reasonable likelihood that future instate or out-of-state competing water uses would consume, degrade, or otherwise affect the water available for the purpose of the reservation" (ARM 36.16.107B (2)(a)), or if "there are constraints that would restrict the applicant from perfecting a water permit for the intended purpose of the reservation" (ARM 36.16.107B(2)(c)).

Amount

The Board must determine the amount needed to fulfill the purpose of the reservation (§85-2-316(4)(A)(iii), MCA). This amount must be based on "accurate and suitable" methods and assumptions. The Board must find that there are no "reasonable cost-effective measures that could be taken within the reservation term to increase the use efficiency and lessen the amount of water required" (ARM 36.16.107(3)).

Public Interest

The Board must find that the reservation is in the public interest (§ 85-2-316(4)(a)(iv), MCA). In making this determination, the Board must weigh and balance "(a) whether the expected benefits of applying the reserved water to beneficial use are reasonably likely to exceed the costs; (b) whether the net benefits associated with granting a reservation exceed the net benefits of not granting the reservation; (c) whether there are no reasonable alternatives to the proposed reservation that have greater net benefits; (d) whether failure to reserve the water will or is likely to result in an irretrievable loss of a natural resource or an irretrievable loss of a resource development opportunity; and (e) whether there are no significant adverse impacts to public health, welfare, and safety." The Board may also consider other factors it finds relevant (ARM 36.16.107B(4)).

Diligence

If the purpose of the reservation requires construction of a storage or diversion facility, the applicant shall establish to the satisfaction of the Board that there will be progress toward completion of the facility and accomplishment of the purpose with reasonable diligence in accordance with an established plan (§ 85-2-316(5), MCA).

No Adverse Effect on Senior Water Rights

The reservation, as proposed for adoption, must not adversely affect water rights in existence at the time of adoption (§ 85-2-316(9), MCA). A reservation cannot be granted if the record of the contested case hearing shows that the exercise of senior water rights would be adversely affected.

SUMMARIES

The remainder of this chapter summarizes the results of DNRC's analyses of the social and environmental effects of granting all, some, or none of the water requested and of putting the water to use as proposed by the applicants. The information presented here is excerpted primarily from chapters Two, Five, Six, and Eight of the draft EIS and from chapters One, Three, and Four of the addendum.

The results are presented here under the relevant Board decision criteria, but do not represent determinations, conclusions, or recommendations of whether any one reservation request satisfies any of the given criteria. Such determinations are made solely by the Board after considering additional information from the contested case hearing.

GCD'S REQUEST ON THE NORTH FORK OF LOWER WILLOW CREEK

GCD is requesting a reservation on the North Fork of Lower Willow Creek, a tributary of Flint Creek, to provide water for supplemental irrigation on 2,900 acres of land west of Hall, as shown in Figure 2-1. This project would require a new dam on the North Fork of Lower Willow Creek. The proposed dam would be 113 feet high, 1,070 feet long, and would store 5,000 acre-feet (af) in a 112-acre reservoir. No new canals would be needed. Water would be released into the North Fork of Lower Willow Creek to refill the existing Lower Willow Creek reservoir.

Qualifications and Purpose

GCD was organized under the state Conservation Districts Act (§ 76-15-101, *et seq.*, MCA) in 1954. Conservation districts are political subdivisions of the state. The stated purpose of the requested reservation is to provide water for supplemental irrigation, which is a beneficial use as defined in Section 85-2-102(2)(a), MCA.

Need

GCD has applied for a reservation and not a permit because it cannot build the project under present economic conditions (GCD 1987). Competing water uses that may limit future water availability on the North Fork of Lower Willow Creek include DFWP's request for instream flow reservations on Flint Creek and the Clark Fork main stem. GCD's project would conflict with DFWP's requested reservations in March and April under average flow conditions. Potential development of irrigable lands on the Clark Fork also may require flows from upstream tributaries.

Amount

GCD has requested up to 11,165 af/year (15.4 cfs) of water to irrigate 2,900 acres of land, but acknowledges that the amount needed for the new reservoir may be less than this. The 11,165 af estimate includes water for lands that are already irrigated with water from Lower Willow Creek reservoir. But the existing reservoir currently meets project demand for full-service irrigation in only 5 years out of 10. The requested reservation would allow GCD to build a new reservoir to catch high spring flows, which would provide for full-service irrigation in 8 years out of 10. The amount was determined based on local crop needs and projected delivery efficiencies. The water would be delivered through existing canals and wheelline sprinkler irrigation systems. DNRC found no economically feasible alternatives that would increase project efficiency or reduce the amount of water required.

Public Interest

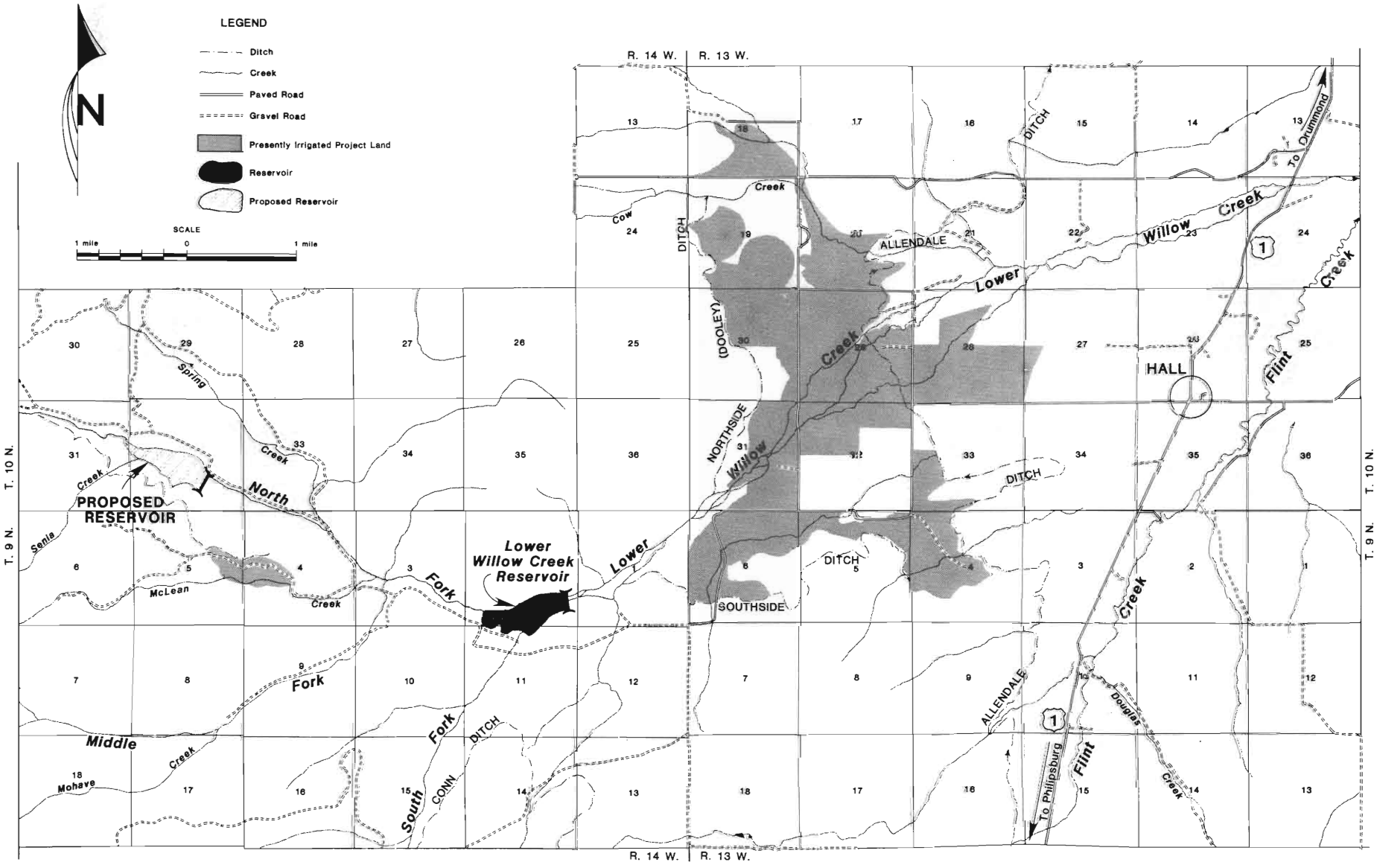
The draft EIS examined the benefits and costs of granting GCD's reservation request on the North Fork of Lower Willow Creek. A summary and comparison of the significant benefits and costs is provided here.

Benefits

If GCD's project on the North Fork of Lower Willow Creek returns a profit, it would directly benefit about 20 ranching families by increasing hay yields by 2,000 tons annually on 2,900 acres of land that is already irrigated. Indirect benefits would include improved recreation on the existing Lower Willow Creek reservoir due to higher and more stable water levels. The project could also slightly increase business income and county tax revenues.

Return flows from the North Fork of Lower Willow Creek project would increase streamflows during the high-demand season at MPC's hydropower dams at Milltown and Thompson Falls. These flow increases would offset springtime depletions that would occur when the MPC dams typically spill water. In an average flow year, the project would allow MPC to increase net annual power production by an estimated 79,600 kWh. This is an annual benefit of $1,751 at current wholesale power rates.

FIGURE 2-1.
LOWER WILLOW CREEK PROJECT AREA



Costs

DNRC estimates project costs to be a minimum of $9.97 million, which is three times greater than GCD's estimate of $2.9 million. This disparity is due primarily to differences in the estimated costs of the spillway and outlet works.

Indirect costs of the project on the North Fork of Lower Willow Creek would include possible degradation of fish habitat due to reduced spring flows in the 2.9-mile stream reach between the proposed and existing reservoirs, flooding of wildlife habitat and irrigated land at the reservoir site, and the preclusion of other uses of the water consumed by the project. Project depletions of streamflow would reduce hydropower production at WWP's Noxon Rapids dam by an estimated 81,300 kWh on average. This is an annual cost of $1,789 at current wholesale power rates. Coupled with MPC's net annual gain of an estimated 79,600 kWh, the net effect would be an annual loss in Montana of 1,700 kWh, or $38 at current wholesale power rates. The project would reduce power production at Columbia River hydroelectric plants downstream from Montana by an estimated 800,440 kWh in an average year. This is an annual cost of $17,610 at current wholesale power rates.

Comparison of Net Benefits and Costs

DNRC estimates that the supplemental irrigation supplied by the project would provide net annual returns of $30 per acre. Based on DNRC's estimates of project costs, net annual returns from the supplemental irrigation would have to be $161 per acre for project benefits to exceed costs.

GCD's estimated costs would require a net annual return of $45 per acre from the supplemental irrigation. If GCD's higher yield and price estimates are used, net annual returns would be $90 per acre.

Based on DNRC's yield and price estimates, project costs would exceed benefits.

Alternatives

Project lands might be served by using water stored in the Georgetown Lake/Silver Lake system. The water rights may be for sale. Preliminary cost estimates indicate this option is economically infeasible, though less infeasible than GCD's proposed project.

Irretrievable Losses

Granting GCD a reservation for this project would give the district an earlier priority date than it would have if it obtained a permit when the project is built. If the dam and reservoir are constructed, 112 acres of currently irrigated pasture would be inundated. Reduced flows in the 2.9 mile reach below the proposed dam could imperil a population of pure strain, westlope cutthroat trout, a species with limited distribution.

Public Health, Welfare, and Safety

GCD's proposed dam on the North Fork of Lower Willow Creek would be classified as a high-hazard dam, requiring measures to protect public safety. In an average flow year, the project would slightly reduce the net annual amount of water available to dilute arsenic in Flint Creek, possibly violating current state water quality standards for arsenic. See Chapter Three of this final EIS for a description of arsenic levels in the upper Clark Fork basin.

GCD'S REQUEST ON BOULDER CREEK

GCD is requesting a reservation on Boulder Creek, a tributary of Flint Creek, to provide new irrigation to 4,093 acres of land southeast of Hall, as shown in Figure 2.2. This project would require a new dam on Boulder Creek. The proposed dam would be 145 feet high, 1,150 feet long, and would store 8,500 af in a 145-acre reservoir. Approximately 33 miles of new canal are proposed to deliver water to project lands.

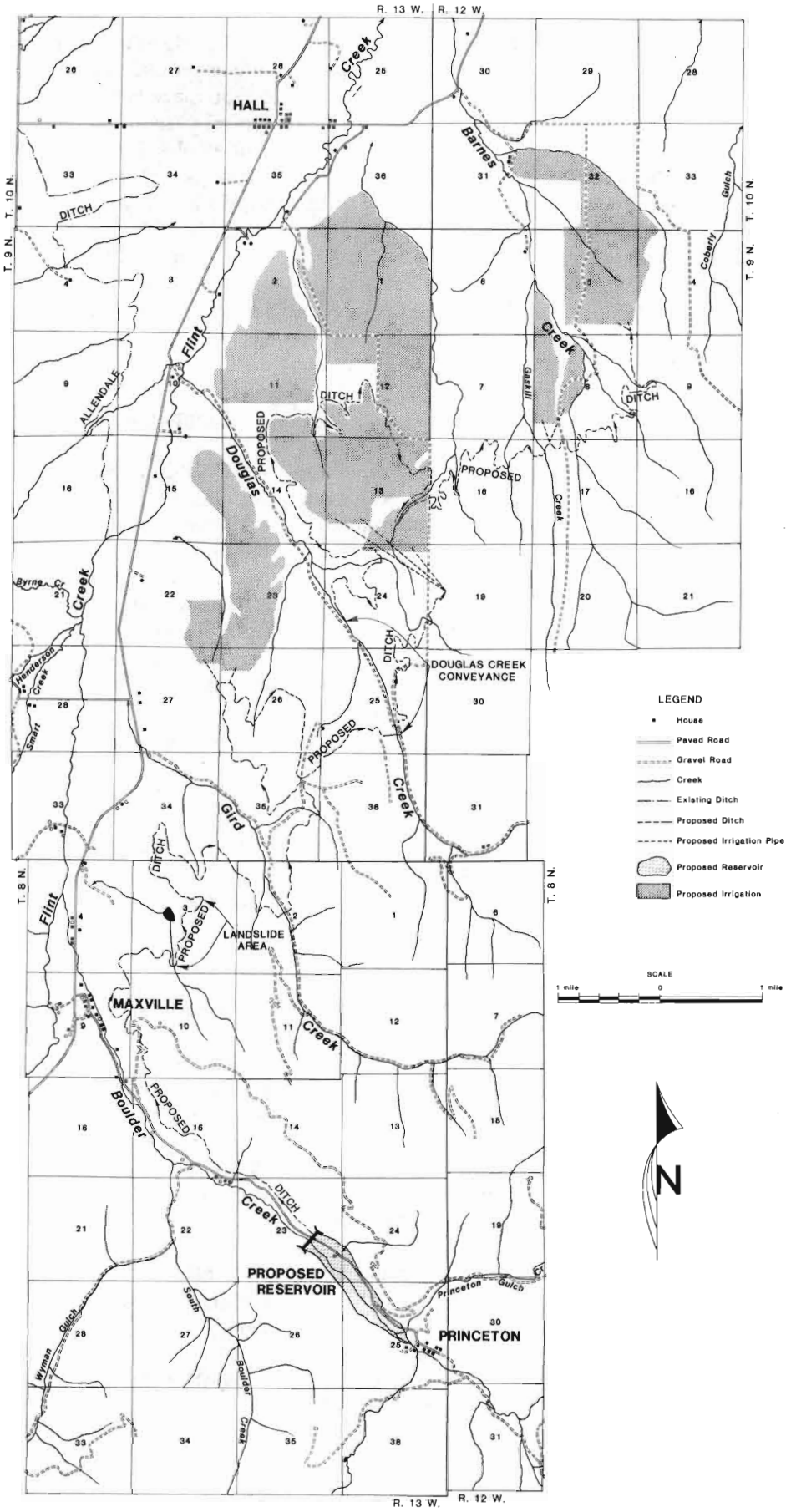
Qualifications and Purpose

GCD was organized under the state Conservation Districts Act (§ 76-15-101, *et seq.*, MCA) in 1954. Conservation districts are political subdivisions of the state. The stated purpose of the requested reservation is to provide water for new irrigation, which is a beneficial use as defined in Section 85-2-102(2)(a), MCA.

Need

GCD has applied for a reservation and not a permit because it cannot build the project under present economic conditions (GCD 1987). Competing water uses that may limit future water availability on Boulder Creek include DFWP's requests for instream flow reservations on Boulder and Flint creeks and the Clark Fork main stem. GCD's project would conflict with DFWP's requested reservations in all months except for

FIGURE 2-2.
PROPOSED BOULDER CREEK RESERVOIR, CANAL, AND IRRIGATED LANDS



May and June in an average flow year. Potential development of irrigable lands on the Clark Fork also may require flows from upstream tributaries, including Boulder Creek.

Amount

GCD has requested 13,998 af/year based on local crop needs and projected delivery efficiencies for sprinkler irrigation. Water would be stored in the reservoir year-round. The peak diversion rate would be 106.7 cfs, and water would be delivered through 33 miles of new canal to sprinkler irrigation systems. If operated as proposed by GCD, the Boulder Creek reservoir would provide a full water supply to the 4,093 acres of project land in roughly 8 or 9 years out of 10.

Of the alternatives examined by DNRC, lining the canal or replacing portions of the canal with a pipeline would reduce canal seepage losses and thus reduce the amount of water needed. Neither of these alternatives was economically feasible.

Public Interest

The addendum examined the benefits and costs of granting GCD's reservation request on Boulder Creek. A summary and comparison of the significant benefits and costs is provided here.

Benefits

If GCD's Boulder Creek project returns a profit, it would directly benefit about 10 ranching families by converting 4,093 acres of pasture to irrigated cropland. Hay production could increase by about 10,000 tons a year. Indirect benefits would include the flatwater recreation opportunities offered by the new reservoir, possible flood control, increased forage for deer and waterfowl, and increased flows in the lower reach of Flint Creek in late summer.

Costs

DNRC estimates that the proposed project would cost $30.4 million, which is more than twice GCD's estimate of $14.2 million. Neither of these estimates includes the costs of acquiring land for the dam and reservoir, acquiring easements for the canal route, and relocating the county road that would be flooded.

Indirect costs of the project would include degradation of fish habitat and riparian vegetation along Boulder Creek at and below the dam site, flooding of wildlife habitat and a 1.3 mile stretch of county road, and the preclusion of other uses of the water.

DNRC estimates that the project would reduce power production from the three hydroelectric plants on the Clark Fork in Montana by 900,500 kWh in a typical year. This is an annual cost of $19,811 at current wholesale power rates. MPC's power production would be reduced by 48,400 kWh at an annual cost of $1,065, and WWP's power production would be reduced by 852,100 kWh at an annual cost of $18,746. The project would reduce power production from Columbia River hydroelectric plants downstream from Montana by an estimated 8,388,500 kWh in a typical year. At current wholesale power rates, this would be an annual cost of $184,547.

Comparison of Net Benefits and Costs

DNRC estimates that the full-service irrigation supplied by the Boulder Creek project would provide net annual returns of approximately $150 per acre. Based on DNRC's estimates of project costs, net annual returns would have to be $358 per acre for project benefits to exceed costs. Based on GCD's cost estimates, net annual returns would have to be $167 per acre for benefits to exceed costs. DNRC's analysis indicates that project costs would exceed benefits.

Alternatives

DNRC examined five alternatives to GCD's proposal. Three of the alternatives--modifying the canal, building a dam on Douglas Creek, and pumping water from Flint Creek--would substantially lower project costs. Of these three alternatives, pumping from Flint Creek would be the cheapest, at a cost of $17.9 million. None of the alternatives is economically feasible.

Irretrievable Losses

Granting GCD a reservation for this project would give the district an earlier priority date than it would have if it obtained a permit when the project is built. Water would not be available for GCD's proposed project if DFWP's requested reservation on Boulder Creek is granted with an earlier priority date.

If the dam and reservoir are constructed, 145 acres of marginal grassland and forest, 1.3 miles of stream and riparian habitat, and one house would be inundated.

Public Health, Welfare, and Safety

GCD's proposed dam on Boulder Creek would be

classified as a high-hazard dam, requiring measures to protect public safety. The project would reduce the net annual amount of water available to dilute arsenic in Flint Creek, possibly violating current state water quality standards. See Chapter Three in this final EIS for estimates of arsenic concentrations in selected tributaries of the upper Clark Fork.

DFWP'S REQUESTS FOR THE UPPER CLARK FORK AND 17 TRIBUTARIES

DFWP is requesting instream flow reservations to protect aquatic habitat, fish, wildlife, and recreation year-round, and to maintain tributary flows from January 1 to April 30 of every year to dilute pollutants in the Clark Fork main stem. DFWP's instream flow requests are summarized in Table 2-1. The location of streams on which DFWP has requested reservations is shown in Figure 2-3.

Qualifications and Purpose

As an agency of the State of Montana, DFWP is a public entity. The stated purpose of the requested reservations is to maintain instream flow for the protection of aquatic habitat, fisheries, wildlife, and recreational resources, and to maintain winter flows for the dilution of metals and other pollutants, which are authorized uses under sections 85-2-102(2)(a) and 85-2-316(1), MCA.

Need

By law, a water right for instream uses can only be obtained with a reservation and not by permit. A pilot program to allow leasing of existing water rights is underway, but this program may be temporary and there are no leasing efforts underway in the upper Clark Fork basin.

If new permits for consumptive uses continue to be issued in the upper Clark Fork basin, the water DFWP has requested for instream purposes would be appropriated for consumptive uses. In addition, nonconsumptive uses such as small hydropower development could deplete portions of reaches critical to fisheries, wildlife, or recreation.

Amount

The amount of water requested for each stream or reach is shown in Table 2-1. To grant DFWP's requested reservations, the Board must find that the methods used to determine the amount of water needed are "accurate and suitable" (ARM 36.16.107(3)).

DFWP used the wetted perimeter inflection point (WETP) method to determine how much instream flow would be needed to protect aquatic habitat for fish and associated food organisms. An overview of how DFWP applied the WETP methodology is provided in Appendix A of the draft EIS, and concerns raised over the application of the WETP method also are discussed in the draft EIS.

To further help the Board determine whether the WETP method used by DFWP is accurate and suitable, DNRC has reviewed several studies that tested whether flow levels indicated by wetted-perimeter methods correlated well to the number or pounds of fish a stream could support. A brief review of these studies is presented below, along with a discussion of other considerations that may influence the accuracy of the WETP method. Finally, DNRC has attempted to place the WETP method in the context of other instream flow methods available. For comparison, a relatively simple, in-office method is described, and then a more advanced (and labor and time intensive) field method is summarized.

Wetted-perimeter Method

DFWP used the WETP method to identify the amount of water needed to cover riffles, which DFWP assumed are the most productive areas of a stream for food organisms used by fish. Under this method, it is assumed that if enough flow remains in a stream to keep riffles wet, then the chief food-producing areas of a stream would be maintained. It follows that if there is enough water to cover the riffles, there would be enough water to protect other types of stream habitat, such as pools, bank cover, channels for fish passage, and spawning and rearing areas.

When used correctly, the WETP method provides a reasonably accurate estimate of the wetted perimeter and can indicate abrupt changes in the amount of stream bottom that remains wet as streamflow increases or decreases. But the precise relationship between wetted perimeter as an indicator of aquatic habitat and the standing crop (number and total weight of fish) a stream will support has not been definitively demonstrated in the upper Clark Fork basin. In its application, DFWP stated that the upper and lower inflection points are thought to bracket flows needed to maintain high and low levels of aquatic habitat.

Several studies have compared the results of wetted perimeter analysis to actual trout production and also to production of food organisms used by trout. Nelson (1980, 1984) studied the relationship between

Table 2-1. DFWP's Reservation Requests

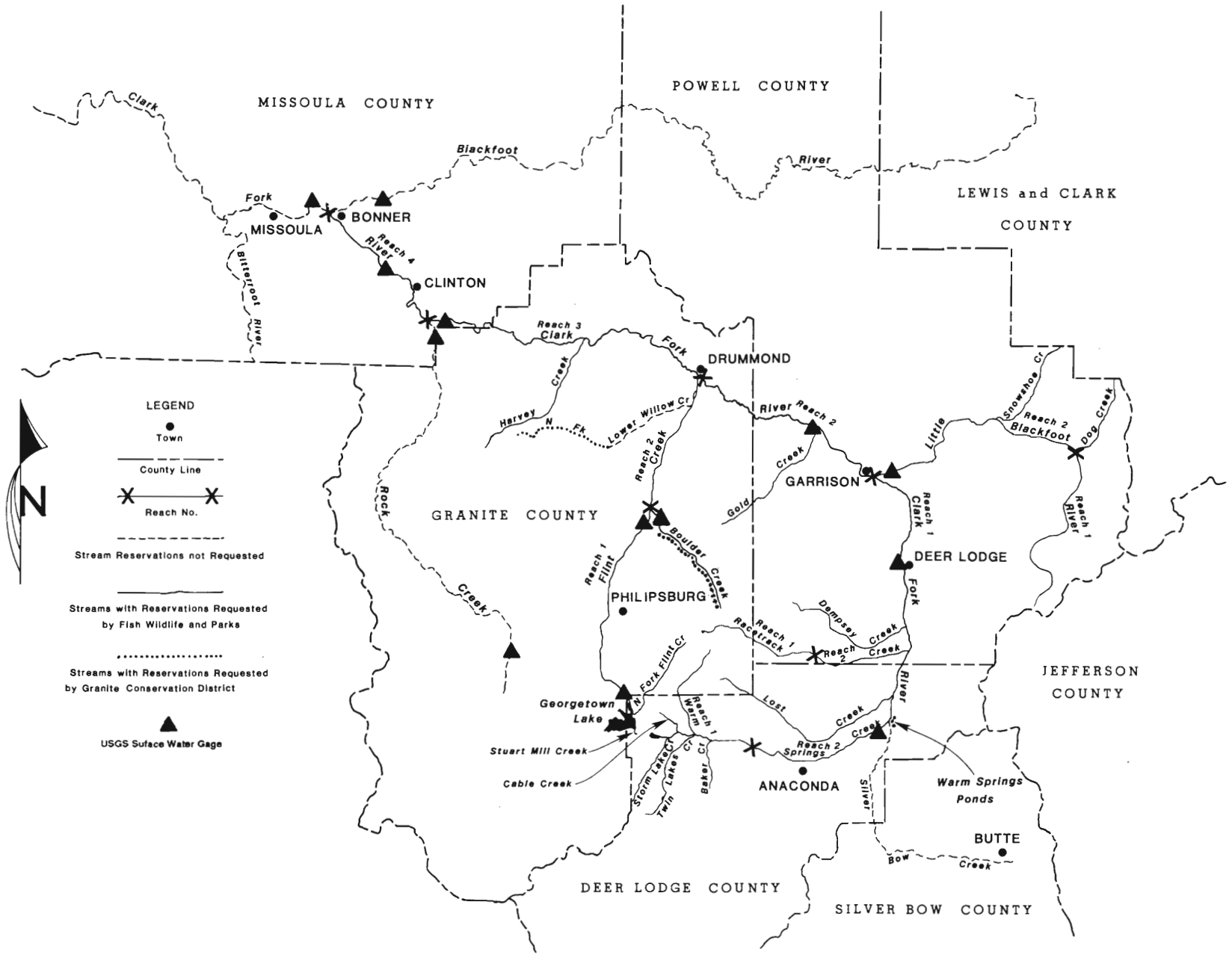
Stream Name	Length of Stream Reach (Miles)	Flows and Volume of Water Requested Year Round	Instream Flows for Water Quality Jan. 1 to April 30
MAIN STEM			
Clark Fork main stem			
Reach 1 (Warm Springs Creek - Little Blackfoot River)	37.8	180 cfs 130,314 af	none
Reach 2 (Little Blackfoot River - Flint Creek)	28.1	400 cfs 289,587 af	none
Reach 3 (Flint Creek - Rock Creek)	35.8	500 cfs 361,983 af	none
Reach 4 (Rock Creek - Milltown)	17.2	600 cfs 434,380 af	none
TRIBUTARIES			
Warm Springs Creek			
Reach 1 (Confluence of Middle Fork Warm Springs Creek - Meyers Dam)	15.3	50 cfs 36,198 af	
Reach 2 (Meyers Dam - Mouth)	16.6	40 cfs 28,959 af	
Barker Creek	5.1	12 cfs 8,688 af	
Cable Creek	5.8	10 cfs 7,240 af	
Storm Lake Creek[b]	10.0	10 cfs 7,240 af 3 cfs 2,172 af	
Twin Lakes Creek	7.5	13 cfs 9,412 af	
Lost Creek	19.9	16 cfs 11,583 af	
Racetrack Creek			
Reach 1 (Confluence of North Fork Racetrack Creek-USFS Boundary)	9.3	26 cfs 18,823 af	
Reach 2 (USFS Boundary - mouth)	10.8	3 cfs 2,172 af	
Dempsey Creek	17.1	3.5 cfs 2,543 af	
Little Blackfoot River			
Reach 1 (Blackfoot Meadows - Dog Creek)	17.4	17 cfs 12,307 af	
Reach 2 (Dog Creek - mouth)	26.9	85 cfs 61,537 af	
Snowshoe Creek	9.2	9 cfs 6,516 af	
Dog Creek	15.5	12 cfs 8,688 af	
Gold Creek	15.0	34 cfs 24,615 af	
Flint Creek			
Reach 1 (Georgetown Lake - Boulder Creek)	28.0	50 cfs 36,198 af	
Reach 2 (Boulder Creek - mouth)	15.7	45 cfs 32,578 af	
Boulder Creek	13.4	20 cfs 14,479 af	
North Fork of Flint Creek	7.5	6 cfs 4,344 af	
Stuart Mill Creek	.3	14 cfs 10,136 af	
Harvey Creek	14.6	3 cfs 2,172 af	

All of the instantaneous base flow, subject to existing, lawfully appropriated water rights until such time as mine waste reclamation allows copper concentrations entering the Clark Fork above Warm Springs Creek to reach acceptable levels in downstream reaches. Flow is requested at each stream's confluence with the Clark Fork.

[a]In addition, DFWP already has claimed rights on Rock Creek and the Blackfoot River.

[b]10 cfs is requested if diversions to Storm Lake do not occur at their usual level. If diversions are resumed at their past levels, the flow request is 3 cfs.

FIGURE 2-3.
RESERVATION REQUESTS IN THE UPPER CLARK FORK BASIN



the actual standing crop of trout and the flow rate. Results of this analysis showed that flow did influence trout standing crops. Nelson (1984) proposed the following relationships:

> *1. Flow reductions affect rainbow trout (ages II+ and older) more severely than brown trout. Like wise, rainbow trout respond more favorably to flow increases than do brown trout.*
>
> *2. In the case of rainbow trout, the reduced flows, while detrimental to older trout, may simultaneously enhance the survival of younger trout to age I+.*
>
> *3. Flow reductions affect the larger, older trout more severely than the smaller, younger trout.*
>
> *4. The pattern of the flows, particularly during spawning, is at least as important as the magnitude of the flows in regulating standing crops.*

Nelson established a relationship between flow and standing crop of trout on four streams in southwest Montana. He then evaluated several instream flow methods to determine how well their predictions would match the established flow requirements (Nelson 1980). In particular, two of these instream flow methods are similar to those used by DFWP. In the multiple transect method examined by Nelson, the transects were located in several habitat types, not just riffles. The single transect method used one transect located in a riffle.

> *Recommendations derived from the four methods were compared to those derived from long-term trout standing crop and flow data. The trout-flow data generally provided two minimum flow recommendations for each reach. Flows less than the absolute minimum recommendation appear to lead to substantial reductions in the standing crops of adult trout or the standing crops of a particular group of adults, such as trophy-size trout. Flows greater than the most desirable minimum recommendation sustained the highest standing crops. The optimum flow should either equal or exceed the most desirable minimum.*
>
> *The recommendations generated by the single transect method for all five reaches compare favorably to the absolute minimums derived from the trout-flow data. Single, well-defined inflection points were generally present and easily interpreted. In addition to providing reliable and consistent recommendations, the single transect method also was the most time and cost efficient of the three field methods.*
>
> *The multiple transect method provided acceptable absolute minimum recommendations for the four reaches having discernible inflection points. Inflection points, when present, were generally not as well defined as those on the wetted perimeter curves derived for the single transect method. In the two reaches having more than one inflection point, the lowermost occurred at the flow approximately equal to the absolute minimum recommendation. While the multiple transect method did provide acceptable absolute minimum recommendations for four of the reaches, it had no advantage over the single transect method. It was costlier, more time consuming, sometimes difficult to interpret, and occasionally unproductive.*

Randolph and White (1984) studied the response of rainbow trout to reduced flows in Ruby Creek, a Madison River tributary. They also tested the hypothesis that, in small streams, the average wetted perimeter of a riffle can be used as a general index of habitat suitability for adult salmonids. They found that summer flow has a regulating influence on rainbow trout numbers and biomass. However, Randolph and White concluded:

> *[The] wetted perimeter was not a consistent index of summer habitat suitability for rainbow trout in Ruby Creek. In the pool-riffle section, wetted perimeter was highly correlated with trout numbers and biomass, and the inflection point on the wetted perimeter curve corresponded closely with the flow at which the rate of trout emigration increased substantially. Correlation between riffle wetted perimeter and trout numbers in the two run-riffle sections was poor. In one run-riffle section the wetted perimeter inflection point corresponded to a flow which would substantially underestimate the flow we observed to be optimum. In the other run-riffle section, which had two wetted perimeter inflection points, one would overestimate the optimum summer flow while the second would slightly underestimate that optimum.*

Cada and others (1983) compared the results of the wetted-perimeter analysis to the production of food organisms used by trout in Appalachian streams. This study tested the assumption that the wetted perimeter should reflect the density, under varying flows, of aquatic organisms used for food by fishes. For most of the sites and organisms examined, the density of food organisms did not show a consistent relationship to changes in wetted perimeter.

Other Considerations

Another concern, especially for the Clark Fork, is that the WETP results do not directly address other habitat factors such as cover, flow levels needed for spawning and rearing, presence of toxic substances, stream temperature, or adequate dissolved oxygen levels. DFWP assumed that cover and spawning and rearing habitat would be adequately maintained if flows in the riffles were at or above the upper inflection point. The other habitat factors (presence of toxic substances, adequate levels of dissolved oxygen, and desirable stream temperatures) were addressed elsewhere in DFWP's reservation application. For example, winter flows from tributaries were requested in order to dilute concentrations of copper in the Clark Fork. Copper is a known toxin to fish. Data on copper concentrations collected along the Clark Fork during the winter indicate that the tributaries contain relatively clean water, which, during period of steady low winter flow, dilutes copper in the Clark Fork (See Chapter Three of this final EIS). During high flows, sediments containing copper are suspended in the river and copper concentrations exceed levels believed to be acutely toxic to freshwater aquatic life. DFWP has not requested reservations of these high flows.

DFWP's application addressed the need for instream flows to dilute nutrients in the Clark Fork. Increased nutrient concentrations allow growth of algae in the river. Algae produce oxygen during the day but consume it at night. Algae growth becomes a problem when nocturnal dissolved oxygen levels fall below the state standard for protection of aquatic life. In the Clark Fork main stem, nocturnal dissolved oxygen levels occasionally fall below the state standard during the summer.

DFWP did not quantify changes in stream temperatures with changes in flow in its application, but took the position that stream temperatures increase during the summer as flows decrease. When stream temperatures rise above about 66° F., trout do not grow because they cannot eat enough to offset metabolic needs. In addition, warmer water holds slightly less dissolved oxygen than cool water. DFWP has monitored stream temperatures in the main-stem Clark Fork, and in summer, stream temperatures do occasionally rise above 66° F. during the days. Flow is one of the most important elements of aquatic habitat, but it is not the only factor that influences stream temperatures. Shading from terrain and streamside vegetation, the amount and temperature of groundwater inflow, air temperature, cloud cover, and other factors play an important role in determining stream temperatures. Flow does influence stream width and depth, which govern how much surface and stream bottom area is available for heat exchange. Water velocity also is controlled by flow, and this determines how long the water is exposed to warming or cooling conditions.

One of the limitations of the WETP methodology identified in the draft EIS is that the selection of inflection points from the graph can be subjective, especially if the slope of the wetted perimeter curve does not change dramatically with changes in flows. The greater the change in slope as flows change, the less subjective the identification of inflection points. The wetted-perimeter curves for each of the 25 stream reaches for which DFWP is seeking reservations are presented in Appendix A in this final EIS.

Most methods used to determine instream flow needs have a subjective component. It may be an assumption that habitat is related to depth and velocity; to wetted perimeter; to a combination of wetted perimeter, depth, and velocity; or to other factors such as mean annual flow or water quality. Such subjectivity does not necessarily mean that method results are incorrect.

Annear and Conder (1983, 1984) evaluated four instream flow methods in Wyoming. Like others (EA Engineering, Science and Technology, Inc. 1986), they found that identifying inflection points on a plot of flow versus wetted perimeter can be subjective.

At many of the study sites, minimum flow recommendations based on subjective determinations using wetted perimeter analysis exceeded average available late season flows (Annear and Conder 1983). According to Annear and Conder (1984), minimum flow estimates that are high "may be acceptable in some cases because if the recommendation were to be found in error at a later date, it would be preferable to overestimate rather than underestimate flow needs. This creates the flexibility to negotiate downwards after making preliminary recommendations, which may be easier than negotiating for higher flows."

Other Methods to Determine Amount of Instream Flow

More than 50 methods are available to determine instream flow needs for fish (EA Engineering, Science and Technology, Inc. 1986). These methods range from simple, in-office approaches to more detailed reach-specific approaches involving complex habitat modeling. To illustrate the types of methods available and how they compare to the method used by DFWP, one of the most simple and one of the most complex approaches are summarized below.

In-office methods for determining instream flow needs for fish are the easiest. Tennant (1976) presented one of the most commonly cited in-office approaches (also known as the Montana Method). Tennant conducted detailed field studies on 11 streams in three states east of the Continental Divide, including Montana. "This work involved physical, chemical, and biological analyses of 38 different flows at 58 cross sections on 196 stream miles affecting both cold-water and warm-water fishes. These studies...reveal that the condition of the aquatic habitat is remarkably similar on most of the streams carrying the same portion of the average flow." Tennant later looked at the flow regimes on 21 additional streams and found a similar relationship.

In the Tennant method, the mean annual flow for a stream is identified and flow recommendations are based on percentages of the mean annual flow for various levels of fish habitat. Excellent to outstanding habitat conditions would be maintained where 60 percent of the mean annual flow remains in the stream. Thirty percent of the mean annual flow was suggested as a base flow to maintain good survival conditions for most life forms. Ten percent of the mean annual flow was the minimum instantaneous flow recommended to sustain short-term survival of most aquatic life forms, and severe degradation of aquatic habitat would occur where instream flows are less than 10 percent of the mean annual flow.

In sharp contrast to the in-office Tennant method, one of the most advanced approaches was developed to predict changes in standing crops of fish and holds promise as a method that might be used to determine instream flow needs. Binns and Eiserman, working in Wyoming, started their analysis by collecting data for 22 habitat variables during late summer (EA Engineering, Science and Technology, Inc. 1986). These variables were weighted and a multiple regression analysis was used to create a model using 9 variables to predict the weight of fish in a stream. The model was shown to correlate very well with fish standing crop ($r^2 = 0.97$). The variables selected by Binns and Eiserman included: late summer stream flow; annual stream flow variation; maximum summer water temperature; nitrate/nitrogen concentration; percent cover; percent eroding streambanks; relative amount of submerged vegetation; water velocity; and stream width. This model was tested in a few additional Wyoming streams by Annear and Conder (1983) and again was found to correlate well with fish standing crop ($r^2 = 0.83$). Because of the number of variables and large amounts of data required, this is a time consuming, labor-intensive, and expensive method.

Several reviews suggest that such an approach would not be directly transferable to other geographic areas, and a new statistical relationship would have to be developed using similar variables. It would also be necessary to show how each variable would change with changes in flow. This would require considerably more field information than DFWP's approach and there is no guarantee that a sound statistical relationship could be established for all situations.

The wetted-perimeter method falls between these two extremes in terms of the amount of time and money expended and the degree to which ecosystem-specific instream flow recommendations can be made. An approach similar to DFWP's was used to recommend instream flows to maintain adequate backwater areas for the rearing of salmon in the Susitna River in Alaska and for hydropower relicensing proceedings in California (Trihey 1987). The BLM has also used this approach, and the USFWS has experimented with this approach in studying the effects of small hydropower developments in the northeastern U.S. (Trihey 1987). Wetted perimeter, along with average depth and average velocity, has been used to determine instream flow recommendations in Colorado (Annear and Conder 1984).

Streams Where the WETP Method was not Used

DFWP did not use the wetted-perimeter method on Cable and Stuart Mill creeks. These are spring-fed creeks, and DFWP assumed that flows would be relatively stable.

On Cable Creek, three flow measurements, ranging from 10.2 to 12.1 cfs, were made at riffles. Based on these measurements, DFWP assumed that 10 cfs would be adequate to maintain the fishery.

In 1988, DNRC made six flow measurements between April and August in Cable Creek at the highway

crossing (NW1/4, NW1/4, SW1/4, Sec. 24, T5N, R13W) and found flows ranging from 5.8 cfs to 16.3 cfs. The Silver Lake ditch enters Cable Creek just above the highway crossing. When the highest flow was measured at the highway crossing, 7.6 cfs was measured in the Silver Lake Ditch (SW1/4, NW1/4, SE1/4, Sec 23, T5N, R13W).

DFWP found no riffles in Stuart Mill Creek to use as measuring sites and instead took a one-time measurement of 14.5 cfs in mid-September. DFWP assumed that flows remain relatively stable and that there is a low potential for other future uses of water from Stuart Mill Creek in justifying its request for 14 cfs. In fact, average monthly flows fluctuate from 10.7 cfs in May to 19.5 cfs in June and back down to 11.4 cfs in September (see Table 3-1 on page 15 of the draft EIS).

Fifty Percent Limit

The Board cannot grant an instream reservation for more than 50 percent of the average annual flow of record on gauged streams (§ 85-2-816(6), MCA). DFWP requested more than 50 percent of the mean annual flow on the following streams with gauges installed: Clark Fork reaches 1, 2, 3, and 4; Warm Spring Creek Reach 2; and the Little Blackfoot River. On August 16, 1990 a stream gauge was installed on Flint Creek near the mouth (White 1990). The limited gauging records may not reflect average flows over the long term on these reaches. Information on average annual flow presented in Table 5-1 of the draft EIS is updated in Table 2-2 below.

Public Interest

The draft EIS examined the benefits and costs of granting DFWP's reservation requests on the Clark Fork main stem and 17 tributaries. A summary and comparison of the significant benefits and costs is provided here.

Benefits

DFWP's requested reservations would benefit the citizens of Montana by preserving existing flow conditions and existing opportunities for recreation, waste dilution, and other instream uses. Fish and other aquatic life would benefit from the maintenance of aquatic habitat at existing levels. Locally severe reductions in flow due to the use of senior water rights during low-flow periods would still occur, but DFWP's reservations would ensure that flows would not be depleted below existing conditions. The reservations would also protect past and future investments made to improve water quality and fisheries. In particular, granting DFWP's requested reservations on the tributaries would ensure that they would continue to con-

Table 2-2. Instream flows requests and average flows based on stream gauges.[a]

	Instream flow requested	Average annual flow of record	50 Percent average annual gauged flow	Years of record	Period of record
Clark Fork - Reach 1	180				
(Deer Lodge)		292	146	11	1978-1989
(Galen)		94.2	47.1	1	1988-1989
Clark Fork - Reach 2	400				
(below Gold Creek)		578	289	12	1977-1989
Clark Fork - Reach 3	500				
(Clinton)		851	425.5	10	1979-1989
Clark Fork - Reach 4	600				
(Turah)		1,050[b]	525	4	1985-1989
Little Blackfoot River	85				
(near Garrison)		165	82.5	17	1972-1989
Warm Springs Creek -	40				
Reach 2		44	22	6	1983-1989
(Warm Springs)					
Flint Creek Reach 1	50				
(Maxville)		100	50	48	1941-1989
(Southern Cross)		29.7	14.9	49	1940-1989

[a]Source: Montana DFWP 1986a; USDI 1990.
[b]USGS does not publish average annual flows until 5 years of records are available, but an average annual flow of 1,050 cfs was calculated for the 4-year period of record.

tribute relatively clean water to help dilute toxic metals in the Clark Fork main stem.

Costs

The primary cost of DFWP's requested reservations is that they would limit the amount of water available for future consumptive development in the upper Clark Fork basin. The most likely form of consumptive development in the upper basin is irrigation. However, the number of permits issued for new irrigation in the upper basin has averaged less than three a year since 1973, and only 8,362 acres of undeveloped irrigable land remain in the upper basin. Depending on the method used to estimate agricultural acreage, these 8,362 undeveloped acres represent from 5 to 9 percent of the total amount of irrigable and irrigated land in the upper basin. If DFWP's requested reservations are granted and enforced, they would preclude the development of additional full-service irrigation in the basin above Rock Creek. Some supplemental irrigation might be possible on a local basis.

The potential for new industrial development, such as mining or hydropower, in the upper basin is unknown, but new consumptive uses could be limited to projects that would purchase water rights or store only flows in excess of DFWP's requested reservation amounts. The reservations would also give DFWP legal standing to object to changes in the place and type of use of existing water rights.

If senior water right holders constrain water availability in the future, then DFWP's requested reservations would pose less of a cost to new consumptive uses. If DFWP's reservations are granted at the lower inflection point, more water would be available for new consumptive uses, but there would still not be enough water available in the basin above Gold Creek for new full-service irrigation development.

Comparison of Net Benefits and Costs

The benefits and costs of DFWP's reservations are not easily compared. Unlike irrigation or dam construction projects, most of the benefits and costs associated with DFWP's requests do not have market values or cannot be reliably forecast and so are difficult to quantify. Also, the correlation between streamflows and resulting benefits has not been conclusively demonstrated on streams in the upper Clark Fork basin. The Board's decision to grant, modify, or deny DFWP's requested reservations will be based on a weighing and balancing of the qualitative benefits of maintaining flows for aquatic habitat, waste dilution, and recreation against the costs of foregone consumptive use development.

Tables 2-3 through 2-9 indicate the resources that would be most significantly affected by DFWP's requested reservations. The Board may use these tables and additional information presented by interested parties at the contested case hearing to assess each stream's fishery, riparian, recreational, and waste dilution value and to weigh these values against the potential for irrigation or other consumptive use development.

Alternatives

At present, a reservation is the only way DFWP can acquire a water right for instream flows. Most of DFWP's requests are based upon the upper inflection point. If DFWP's reservations are granted instead at the lower inflection point, more water would be available in most months for new consumptive uses, but there would still not be enough water available in the basin above Gold Creek for new full-service irrigation development. On reaches of the Clark Fork below Gold Creek, an additional 20.6 to 286.4 cfs would be available during August in 8 years out of 10. Granting DFWP less water than requested would also offer less protection to aquatic and riparian habitat, fisheries, water quality, and recreational opportunities. These resources could be degraded beyond existing conditions if new uses further deplete flows.

Irretrievable Losses

If DFWP's reservations are *not* granted, DFWP would be unable to prevent new water uses and subsequent depletions of streamflows in the basin. This may result in the irretrievable loss, especially in the tributaries, of fish species with limited numbers or distribution in Montana, including westslope cutthroat trout, bull trout, and shorthead sculpins. There also may be an irretrievable loss of spawning and rearing habitat and of habitat for resident and some migratory fish populations.

Public Health, Welfare, and Safety

Public health, welfare, and safety would not be adversely affected by DFWP's requested reservations. Maintenance of instream flows would help sustain existing levels of dilution flows, particularly in the Clark Fork main stem.

Table 2-3. Fish Species in the Upper Clark Fork Basin by Stream Reach.

Stream Reach	Gamefish: Cutthroat trout	Gamefish: Westslope cutthroat trout	Gamefish: Rainbow trout	Gamefish: Brown trout	Gamefish: Bull trout	Gamefish: Brook trout	Gamefish: Bull/Brook hybrid	Gamefish: Mountain whitefish	Gamefish: Largemouth bass	Other fish: Sculpin	Other fish: Shorthead sculpin	Other fish: Longnosed dace	Other fish: Largescale sucker	Other fish: Longnose sucker	Other fish: Redside shiner	Number of trout per mile (dominant game fish in parenthesis)	Comments
Clark Fork Reach 1 (Warm Springs-Garrison)	●		●	●	●	●		●		●			●	●	●	143-2334 (brown trout)	The first 2.3 miles of stream below the Warm Springs treatment ponds has developed a very good brown trout fishery since 1972 when no trout were present. Sculpins, a forage fish, are found in this reach. Trout numbers decrease as one moves downstream from the treatment ponds where metals are removed.
Clark Fork Reach 2 (Garrison-Drummond)	●		●	●	●			●	●	●			●	●		127-499 (brown trout)	Water quality is degraded from metals contamination.
Clark Fork Reach 3 (Drummond-Rock Creek)	●		●	●	●			●	●				●	●		48-123 (brown trout)	Sculpins, a forage fish, are absent from this reach. Northern squawfish, yellow perch, and pumpkinseed are found rarely.
Clark Fork Reach 4 (Rock Creek-Milltown Dam)	●		●	●	●			●	●	●			●	●		309-440 (brown trout)	Clean water from Rock Creek appears to dilute the dissolved metals. Northern squawfish, yellow perch, and pumpkinseed are found rarely.
Warm Springs Creek (upper)	●				●											502 > than 6" (brown trout)	Very good fish habitat. Fish reproduce naturally in this reach.
Warm Springs Creek (lower)				●				●						●		492 (brown trout)	This reach is important because brown trout and mountain whitefish from the Clark Fork use this reach to spawn. Water quality in the Clark Fork is not conducive to spawning.
Barker Creek		●	●		●	●								●		(bull trout)	Steep gradient stream probably used for spawning by bull trout from Warm Springs Creek. No population estimate available.
Cable Creek	●		●		●	●				●						1,197 (brook trout)	Only self-sustaining population of rainbow trout in the Warm Springs Creek drainage. Brook trout most abundant, bull and cutthroat trout are rare. Provides clean water to Warm Springs Creek.
Storm Lake Creek	●				●	●										145	Provides clean water to Warm Springs Creek. Historically, flows have been diverted to Silver Lake by AMC.
Twin Lakes Creek		●			●	●	●									880 > than 6" (cutthroat and bull trout)	Fish from Warm Springs Creek may spawn here. Very good water quality.
Lost Creek	●			●	●	●		●						●	●	880 (brown trout)	Brown trout are the most numerous trout present. Sampling in the fall indicates a large number of brown trout and mountain whitefish from the Clark Fork may be using Lost Creek for spawning.
Racetrack Creek (upper)	●			●		●		●		●						?	Cutthroat trout are found throughout this reach while whitefish and brown trout are found in the lower end. Fish are generally small (less than 10") due to low nutrient levels. A popular fishing stream.
Racetrack Creek (lower)	●			●		●		●		●						585 (brown trout)	Brown trout from the Clark Fork may use this reach for spawning.

Sources: DFWP 1986b, MNRIS 1987; Thomas and Workman 1986 (See draft EIS.)

Table 2-3. (con'd) Fish Species in the Upper Clark Fork Basin by Stream Reach.

Stream Reach	Gamefish: Cutthroat trout	Westslope cutthroat trout	Rainbow trout	Brown trout	Bull trout	Brook trout	Bull/Brook hybrid	Mountain whitefish	Largemouth bass	Sculpin	Shorthead sculpin	Longnosed dace	Largescale sucker	Longnose sucker	Redside shiner	Number of trout per mile (dominant game fish in parenthesis)	Comments
Dempsey Creek	●			●		●										776-880	Cutthroat trout rare, brook trout common, and brown trout abundant.
Little Blackfoot River (upper)		●	●	●	●	●	●	●		●						645	A productive fishery in a smaller stream.
Little Blackfoot River (lower)	●		●	●	●	●		●		●	●				●	906 (brown trout)	The stream has been disturbed but the study reach has a substantial population of brown trout. Shorthead sculpins are a species of special concern because of their limited distribution.
Snowshoe Creek	●			●				●		●			●			475 (brown trout) > than 6"	Cutthroat trout are most numerous in the upper reaches of the stream while brown trout are more numerous in the lower stream reaches. The lower reaches are low-gradient and appear to receive a considerable amount of groundwater inflow.
Dog Creek		●		●	●	●		●								541 (brown trout)	In an upstream section, 218 brown trout per mile were found while a lower reach had a population of 541 trout per mile, including all trout species. Genetically pure westslope cutthroat trout were found in this stream.
Gold Creek	●	?		●		●		●								370 in summer, 1,180 in fall (brown trout)	An important spawning stream. Brown trout and whitefish probably from the Clark Fork use this stream for spawning. Tributaries to the Clark Fork used for spawning are not common in this reach of the Clark Fork.
Flint Creek (upper)	●		●	●	●	●		●		●					●	877	A diverse fish population in a broad valley with extensive irrigation.
Flint Creek (lower)	●			●	●			●		●					●	567 (brown trout)	Fishery appears limited by siltation caused by bank erosion and turbid irrigation return flows.
Boulder Creek	●	?		●	●											317	Reaches above Princeton have a sparse trout population, while trout are more abundant near the mouth. Bull trout are reported to ascend the stream for spawning. The cutthroat appear to be pure westslope species.
North Fork of Flint Creek	●		●		●	●											One of two tributaries to Georgetown Lake used for spawning. Rainbow-cutthroat hybrids, rainbow trout, and brook trout are known to spawn here.
Stuart Mill			●			●											This 1/3-mile long spring creek is used for spawning by Kokanee salmon, brook trout, and rainbow trout from Georgetown Lake in large numbers. Young fish move down into the lake.
Harvey Creek		●	●	●	●	●				●		●	●			127	Mostly small trout in this creek. Spawning runs from the Clark Fork seem to be cut off by an irrigation diversion near the mouth of the creek.
North Fork Lower Willow Creek		●				●										121/500 feet	A small creek with an abundant population of pure strain west slope cutthroat trout.

Sources: DFWP 1986b; MNRIS 1987, Thomas and Workman 1986 (See draft EIS.)

Table 2-4. Typical Animals and Waterfowl Use Found Along Clark Fork Tributaries Affected by the Reservation Process.

Stream	Big Game										Furbearers				Waterfowl Use					Gamebirds		Winter Range	Comments
	Whitetail	Mule Deer	Moose	Elk	Black Bear	Bighorn	Mountain Goat	Beaver	Mink	Muskrat	Red Fox	Raccoon	Marten	Limited	Moderate	Substantial	Nesting	Mountain Grouse[1]	Gray Partridge	Pheasant	Deer	Elk	
Warm Springs Creek (upper)	●	●	●	●				●	●	●							●					●	Critical elk range.
Warm Springs Creek (lower)	●							●	●	●	●				●			●	●				Provides open water when other waters are ice covered.
Barker Creek		●	●	●				●	●	●				●			●						
Cable Creek	●	●	●	●				●	●	●					●		●						
Storm Lake Creek								●	●	●							●						Waterfowl use not evaluated.
Twin Lakes Creek	●	●	●	●				●	●	●				●			●						
Lost Creek	●	●	●	●		●		●	●	●	●				●	●	●	●				●	Critical elk range.
Racetrack Creek (upper)		●	●	●				●	●	●			●	●		●	●						Lynx are also present.
Racetrack Creek (lower)	●	●	●	●				●	●	●					●			●	●				
Dempsey Creek	●	●	●	●				●	●	●				●			●	●				●	Critical elk range.
Little Blackfoot River (upper)	●	●	●	●	●			●	●	●					●		●						Waterfowl frequently observed on beaver ponds.
Little Blackfoot River (lower)	●	●			●			●	●	●					●	●	●						Franklin's grouse not present. High density of nesting red-tailed hawks.
Snowshoe Creek	●	●		●				●	●	●					●	●	●	●					Groundwater inflow extends open water season.
Dog Creek		●	●	●				●	●	●					●	●	●						Waterfowl use in meadow and beaver pond sections.
Gold Creek	●	●		●				●	●	●		●		●							●		Deer winter range found near the middle 2 miles.
Flint Creek (upper)	●	●	●	●				●	●	●				●			●	●					
Flint Creek (lower)	●	●	●	●				●	●	●					●	●	●	●					
Boulder Creek	●	●	●	●			●	●	●					●			●						
North Fork Flint Creek	●	●	●	●											●		●						Waterfowl use lower reach.
Stuart Mill Creek	●		●						●	●					●	●	●						Provides open water during cold weather periods.
Harvey Creek	●							●	●	●		●			●								Groundwater inflow extends open water season.
North Fork Lower Willow Creek Reservoir Site								●															Deer winter range 1.5 miles to southwest.

[1]Mountain grouse category includes ruffed grouse, blue grouse, and Franklin's grouse.
Sources: DFWP, 1986b; Flath, 1987; Froenfelker, 1987; McCleerey, 1987; Nielson, 1987; Murphy, 1987 (See draft EIS.)

Table 2-5. Typical Plants and Condition of Vegetation Found Along Clark Fork Tributaries Affected by the Reservation Process.

Stream	Trees							Shrubs			Herbs		Vegetation condition		Comments
	Cottonwood	Aspen	Spruce	Subalpine fir	Lodgepole	Douglas-fir	Willow	Alder	Ninebark	Sedges	Grasses	Poor	Fair	Good	
Warm Springs Creek (upper)					●		●		●	●	●			●	Vegetation is well established.
Warm Springs Creek (lower)							●	●			●		●		Some riparian communities have been damaged by rapid flows and erosion due to nearby road construction.
Barker Creek		●	●				●	●						●	Trees and shrubs grow in dense stands.
Cable Creek													●		Extensive meadows near mouth. Lower sections are heavily grazed by livestock.
Storm Lake Creek		●	●				●	●							
Twin Lakes Creek		●	●				●	●							Flows through forested areas.
Lost Creek													●		Vegetation scarce in upper section. Condition improves to well preserved near the mouth.
Racetrack Creek (upper)														●	Abundant riparian vegetation.
Racetrack Creek (lower)													●		Vegetation scarce in upper section. Condition improves to well preserved near the mouth.
Dempsey Creek	●						●	●							Cottonwoods found on lower reaches.
Little Blackfoot River (upper)			●	●			●	●							
Little Blackfoot River (lower)	●						●								
Snowshoe Creek											●				Riparian vegetation is severely restricted.
Dog Creek															Meadow sections present.
Gold Creek															No information available.
Flint Creek (upper)							●	●							Shrub thickets are scattered. Development of continuous shrub stands prevented by livestock grazing.
Flint Creek (lower)							●	●							Shrub thickets are scattered and restricted by livestock grazing.
North Fork Flint Creek							●	●							
Stuart Mill Creek							●	●		●					
Harvey Creek															No information available.
Boulder Creek					●	●	●		●	●					Douglas-fir and ninebark grow on north aspects. Douglas-fir and lodgepole grow on south aspects. Willows and sedges near stream.
North Fork Lower Willow Creek Reservoir Site															Composed of prairie grassland, wet meadow, and stands of willow.

Sources: DFWP, 1986b; Murphy, 1987; Nielson, 1987 (See draft EIS.)

Table 2-6. Fishing Pressure (Angler Days per Year)

Stream or River	1985-86	1984-85	1983-84	1982-83	Average	N*
Clark Fork - R#1 Warm Springs Creek-Little Blackfoot	5,077	5,809	4,557	4,264	4,927	4
Clark Fork - from Little Blackfoot River - Bitterroot River	12,507	15,069	14,214	9,268	12,763	4
Warm Springs Creek R#1 Middle Fork-Meyers Dam	5,900	3,881	2,237	3,936	3,989	4
Warm Springs Creek R#2 Meyers Dam-Mouth						
Barker Creek					U	0
Cable Creek			412	150	281	2
Storm Lake Creek				50	50	1
Twin Lakes Creek		641		82	362	2
Lost Creek	1,057			411	734	2
Racetrack Creek R#1 North Fork to FS Boundary	698			191	445	2
R#2 FS Boundary to Mouth						
Dempsey Creek				193	193	1
Little Blackfoot River R#1 Blackfoot Meadows-Elliston	1,645	1,519	497	3,065	1,682	4
R#2 Elliston-Mouth	4,307	3,444	3,687	7,180	4,655	4
Snowshoe Creek		816		635	726	2
Dog Creek 206169101	1,336	2,568	274	391	1,142	4
Gold Creek	275	435		1,242	651	3
Flint Creek R#1 Georgetown Lake-Boulder Creek	4,103	5,373	4,634	3,417	4,382	4
R#2 Boulder Creek to Mouth						
Boulder Creek		523	733	1,559	938	3
North Fork Flint Creek		941		150	546	2
Stuart Mill Creek					U	0
Harvey Creek	412		420	150	327	3

*N= Number of years out of four with reported fishing pressure

Source: DFWP 1989.

Table 2-7. Water quality of streams where reservations are required.

Stream	Water quality classification[a]	Degree to which uses designated by a stream's water quality classification are impaired
Clark Fork		
Warm Springs Creek - Cottonwood Creek near Deer Lodge	C-2	The Clark Fork has been contaminated with sediment containing metals from past mining and related activities. Nutrients are present in the river from municipalities and agriculture at concentrations high enough to cause algae growth to be a nuisance. During the summer, dissolved oxygen levels have fallen below the state standard. Summer temperatures have risen to levels thought to be detrimental to trout. The river receives discharges from several municipal wastewater treatment plants. Flows have been altered. Overall, the degree to which uses have been impaired is severe.
Cottonwood Creek near Deer Lodge - Little Blackfoot River	C-1	
Little Blackfoot River - Blackfoot River	B-1	
Warm Springs Creek		
Above Meyers Dam	A-1	Moderate impairment of use due to metals from past mining and related activities, habitat alteration, and sediment and flow alteration by migration.
Near Anaconda		
Below Meyers Dam	B-1	
Barker Creek	A-1	None documented.
Cable Creek	A-1	Moderate impairment of use due to sediment from streambank erosion.
Storm Lake Creek	A-1	None documented.
Twin Lakes Creek	A-1	None documented.
Lost Creek	B-1	Moderate impairment of use due to sediment from agriculture and flow alteration.
Racetrack Creek	B-1	Moderate impairment of use due to sediment and flow alteration.
Dempsey Creek	B-1	Moderate impairment of use due to sediment and flow alteration.
Little Blackfoot River	B-1	Moderate impairment of use due to habitat alteration, flow alteration, sediment, and nutrients.
Snowshoe Creek	B-1	Moderate impairment of use due to sediment and flow alteration.
Dog Creek	B-1	Moderate impairment of use due to sediment.
Gold Creek	B-1	Moderate impairment of use due to habitat alteration from placer mining and sediment from agriculture. The stream is also a natural source of phosphorous, a nutrient that contributes to algae growth in the Clark Fork.
Flint Creek	B-1	Moderate impairment of use due to metals from past mining, sediment from mining and agriculture, and flow alteration.
Boulder Creek	B-1	None documented.
North Fork Flint Creek	A-1	None documented.
Stuart Mill Creek	A-1	None documented.
Harvey Creek	B-1	None documented.
North Fork Lower Willow	B-1	None documented.

Source: DHES. Undated.
Montana Nonpoint Source Assessment Report. Loren Bahls, Supervisor. Helena. 120 pp.
[a]See page 43 for a brief overview of the water quality classification system.

Table 2-8. Irrigable acreages in the upper Clark Fork basin

Drainage	Full service Acres not considering water availability	Full service Acres taking water availabilty into consideration
Clark Fork		
Bonner-Rock Creek	348	348
Rock Creek-Drummond	268	268
Drummond-Gold Creek	963	963
Gold Creek-Garrison	195	195
Perkins Creek	-0-	-0-
Warm Springs Creek	-0-	-0-
Carten Creek	-0-	-0-
Garrison-Deer Lodge	2,976	2,976
Mullan Gulch	-0-	-0-
Willow Creek	-0-	-0-
Deer Lodge-Warm Springs	1,248	1,248
Warm Springs Creek	-0-	-0-
Lost Creek	-0-	-0-
Racetrack Creek	-0-	-0-
Caribou Creek	-0-	-0-
Peterson Creek	-0-	-0-
Dempsey Creek	-0-	-0-
Cottonwood Creek	-0-	-0-
Fred Burr Creek	-0-	-0-
Tin Cup Joe Creek	-0-	-0-
LaMarche Creek	-0-	-0-
Barker Creek	-0-	-0-
Twin Lakes Creek	-0-	-0-
Flint Creek		
Drummond-Maxville	360	360
Lower Willow Creek	-0-	-0-
Maxville-Georgetown Lake	442	442
North Fork Flint Creek	-0-	-0-
Silver Creek	-0-	-0-
Boulder Creek	-0-	-0-
Little Blackfoot		
Garrison-Headwaters	1,042	1,042
Dog Creek	134	134
Snowshoe Creek	-0-	-0-
Trout Creek	-0-	-0-
Carpenter Creek	-0-	-0-
Six Mile Creek	-0-	-0-
Telegraph Creek	386	386
Total	8,362	8,362

Drainage	Full service Acres not considering water availability	Full service Acres taking water availability into consideration
Irrigable acreage along tributaries of Flint Creek		
Henderson Creek	446	-0-
South Fork Lower Willow Creek	182	-0-
West Fork Lower Willow Creek	142	-0-
Lower Willow Creek	179	-0-
Cow Creek	2,203	-0-
Marshall Creek	325	-0-
Total	3,477	-0-
Irrigable acreage along tributaries of the Little Blackfoot River		
Spotted Dog Creek	480	-0-
Trout Creek	576	-0-
Telegraph Creek	467	-0-
Snowshoe Creek	1,094	-0-
Carpenter Creek	518	-0-
Six Mile Creek	806	-0-
Gimlet Creek	557	-0-
Three Mile Creek	1,267	-0-
Total	5,765	-0-

Table 2-9. Estimated Flows in Excess of 50 Percent of the Average Annual Flow in Reaches 1 Through 4 of the Clark Fork, 8 Years out of 10.[a]

Reach	Location	50% Average[b] annual flow (cfs)	Excess Flows (cfs) Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	Deer Lodge	146	77.1	105.4	71.7	74.9	83.4	132	136.3	191.6	133.3	0	0	6.1
2	Below mouth of Little Blackfoot	289	0	14.7	0	0	0	53.1	147.9	468.7	312.7	0	0	0
2	Gold Creek	289	69.3	104.6	45.8	40.7	84.9	160.8	254.6	639.9	418.8	0	0	0
	Below mouth of Flint Creek	425	93.8	121.6	24	8.6	60	160.8	263.6	642.6	418.2	0	0	0
3	Above mouth of Rock Creek	425	178.4	186.3	113.4	31	114.1	211.8	376.6	595.4	656.4	0	0	30.8
4	Above mouth of Blackfoot River	525	319.8	319.6	208	159.6	263.2	368	657.6	1957.6	2159.8	407.4	61.4	176.6

[a]This table is a revised version of Table 5-2 in the draft EIS (page 51). Changes from the draft version have been made in response to comments received and additional gauge records for the years since the draft EIS was published. The flow estimates in this table are derived by subtratcing one-half of the average annual flow of record from simulated monthly flows based on DNRC's computer modeling.

[b]Under Montana law, the Board cannot grant an instream reservation on a gauged stream for more than 50 percent of the average annual flow of record.

Table 2-9.(con'd) Estimated Flows in Excess of DFWP's Requested Amounts on Reaches 1 through 4 of the Clark Fork, 8 Years out of 10.[a]

Reach	Location	DFWP's Request[b] (cfs)	Excess Flows (cfs) Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	Deer Lodge	180	43.1	71.4	37.7	40.9	49.4	98	102.3	157.6	99.3	0	0	0
2	Below mouth of Little Blackfoot	400	0	0	0	0	0	0	36.9	357.7	201.7	0	0	0
2	Gold Creek	400	0	0	0	0	0	49.8	143.6	528.9	307.8	0	0	0
3	Below mouth of Flint Creek	500	18.8	46.6	0	0	0	85.8	188.6	567.6	343.2	0	0	0
3	Above mouth of Rock Creek	500	103.4	111.3	38.4	0	39.1	136.8	301.6	520.4	581.4	0	0	0
4	Above mouth of Blackfoot River	600	244.8	244.6	133	84.6	188.2	293	582.6	1882.6	2084.8	332.4	0	101.6

[a]The flow estimates in this table are derived by subtracting the amount requested by DFWP from simulated monthly flows based on DNRC's computer modeling.
[b]The Board cannot grant an instream flow reservation for more than 50 percent of the average annual flow of record on gauged streams.

Estimated Flows in Excess of the Lower Inflection Points for Reaches 1-4 of the Clark Fork, 8 Years out of 10.[a]

Reach	Location	Lower inflection point (cfs)	Excess Water Available (cfs) Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	Deer Lodge	90	133.1	161.4	127.7	130.9	139.4	188.0	192.3	247.6	189.3	16.2	0	62.1
2	Below mouth of Little Blackfoot River	200	72.7	103.7	68.8	65.0	83.3	142.1	236.9	557.7	401.7	0	0	9.7
2	Gold Creek	200	158.3	193.6	134.8	129.7	173.9	249.8	343.6	728.9	507.8	24.1	0	46.3
3	Below mouth of Flint Creek	180	338.8	366.6	269.0	253.6	305.0	405.8	508.6	887.6	663.2	100.6	20.6	205.6
3	Above mouth of Rock Creek	180	423.4	431.3	358.4	276.0	359.1	456.8	621.6	840.4	901.4	211.3	100.3	275.8
4	Above mouth of Blackfoot River	300	544.8	544.6	233.0	184.6	788.2	393.0	682.6	2182.6	2384.8	632.4	286.4	401.6

[a]The flow estimates in this table are derived by subtracting the lower inflection point from simulated monthly flows based on DNRC's computer modeling.

TABLE 2-9. (con'd) Estimated Excess Flows on Reach 2 of the Little Blackfoot River, 8 Years out of 10.[a]

		Flows in Excess (cfs)											
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
DFWP's Request	85	0	0	0	0	0	0	38[b]	299.8	198.8	0	0	0
50% Ave. Annual	82.5	0	0	0	0	0	0	40.5[b]	302.3	201.3	0	0	0
Lower Infl. Pt.	45	4.8	4.4	0	0	9.4[b]	21[b]	78[b]	339.8	238.8	25.8	0	0

[a]Based on the USGS gauge near the mouth of the Little Blackfoot River and simulated monthly flows modeled by DNRC.
[b]On tributaries, DFWP also requests all of the instantaneous base flow from January 1 through April 30. If this portion of the reservation is granted, there would be no excess water available during these months.

Estimated Excess Flows on Reach 1 of Flint Creek, 8 Years out of 10.[a]

		Flows In Excess (cfs)											
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
DFWP's Request	50	23	4	0	0	0	0	19[b]	49	67	46	49	28
50% Ave. Annual	50 identical												
Lower Infl. Pt.	35	38	19	11	2[b]	8[b]	15[b]	34[b]	64	82	61	64	43

[a]Based on the USGS gauge at Maxville and simulated monthly flows modeled by DNRC.
[b]On tributaries, DFWP also requests all of the instantaneous base flow from January 1 through April 30. If this portion of the reservation is granted, there would be no excess water available during these months.

Estimated Excess Flows on Boulder Creek, 8 years out of 10.[a]

		Flows In Excess (cfs)											
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
DFWP's Request	20	0	0	0	0	0	0	0	58	95	12	0	0
50% Ave. Annual	23.5	0	0	0	0	0	0	0	54.5	91.5	8.5	0	0
Lower Infl. Pt.	10	8	10	9	7[b]	7[b]	7[b]	10[b]	68	105	22	1	2

[a]Based on the USGS gauge on Boulder Creek at Maxville and simulated monthly flows modeled by DNRC.
[b]On tributaries, DFWP also requests all of the instantaneous base flow from January 1 through April 30. If this portion of the reservation is granted, there would be no excess water available during these months.

CHAPTER THREE

ADDITIONAL INFORMATION AND OTHER PLANNING EFFORTS

INTRODUCTION

The first section of this chapter presents additional information to clarify the analyses contained in the draft EIS and addendum. New information that was not available when the draft and addendum were prepared is also presented. Some information in this chapter was added in response to comments on the draft EIS and addendum.

The second section describes other planning efforts ongoing in the Clark Fork basin. The activities included here may influence or be influenced by the requested reservations.

SECTION I - ADDITIONAL INFORMATION

WATER AVAILABILITY

The Effect of DFWP's Reservations on Flows Below Milltown Dam

DNRC received a number of comments concerning DFWP's instream flow requests and the effect on flows in the Clark Fork through Missoula. In the draft EIS, DNRC examined both the legal and practical implications of DFWP's requested reservations, and this distinction is further clarified in the following discussion.

No Legal Protection of Flows

DFWP's requested reservations would legally protect instream flows in the upper Clark Fork only as far downstream as the Milltown Dam. Legally, DFWP's requested reservations would not protect flows through Missoula because no reservations are requested below Milltown Dam. If a consumptive use was permitted and developed below the Milltown Dam, water could be withdrawn from the Clark Fork, and DFWP would have no legal basis for objecting to the depletions. Though DNRC knows of no plans for such development, it is a *possibility*. Flows through and below Missoula could be depleted despite DFWP's upstream reservations.

Contribution to Downstream Flows Still Likely

In practical terms, as long as no water is consumed below Milltown Dam, granting DFWP's requested reservations would ensure that the upper Clark Fork would continue to contribute flows through Missoula and points downstream. Based on a comparison of flows from the USGS gauge on the Blackfoot River near Bonner and the gauge on the Clark Fork above Missoula, the Clark Fork contributes about 40 percent of the mean monthly flows through Missoula during May, June, July, and August. This percentage increases to about 50 percent during April and September and to about 60 percent during the remainder of the year. The Blackfoot River and Rattlesnake Creek contribute the remainder of flows in the Clark Fork through Missoula. DFWP is concerned that future diversions on the Blackfoot could reduce flows in the Clark Fork below the confluence of these two rivers (see comment 158 in Chapter Four of this final EIS). DFWP has Murphy Rights (see the response to comment 105) that protect instream flows on the Blackfoot River, but water in excess of these and other existing rights is still available for appropriation in that drainage. If future diversions in the Blackfoot did deplete flows in the Clark Fork, the contribution of flows from the upper Clark Fork would constitute a larger percentage of the remaining total flow.

If DFWP's Reservations are Denied

Legally, instream flows to protect recreation and water quality below Milltown Dam would not be directly protected whether DFWP's requested reservations are granted or denied. However, if the reservations are denied, future consumptive uses in the upper Clark Fork basin might be developed, resulting in reduced flows through Missoula. The most likely, foreseeable cause of future depletions in the Clark Fork basin above Milltown Dam is irrigation development. Even with full development of sprinkler irrigation on the estimated 8,362 acres of undeveloped irrigable land in the upper basin, average monthly flows at Missoula would be reduced by less than 3 percent. If future depletions occur in the winter or otherwise exceed

DNRC's estimates, then flows below Milltown Dam would be reduced accordingly. It is possible that cumulative depletions in the upper basin could significantly reduce flows at Missoula and points downstream.

STREAMFLOWS

DNRC has revised its estimates of median flows in Lower Willow Creek at the mouth and in Flint Creek at the mouth, as shown in Table 3-1. Numbers printed in bold have been revised from the estimates given in Table 3-4 in the draft EIS and Table 3 of Appendix A in the addendum.

DNRC also found additional flow records for several tributaries of the upper Clark Fork. Although these records are not inclusive for a long historical period, they do indicate instantaneous flow rates for particular reaches (see Table 3-2).

DNRC (Cawlfield and Smith 1989) estimated mean annual flows for tributaries on which DFWP requested reservations. DNRC used a method developed by Potts (1983) for estimating runoff from ungaged streams in western Montana. This method correlates mean annual precipitation and basin area with mean annual runoff.

Potts' method is based on the equation:
$Q_{aa} = 0.0186(PA)^{1.0042}$ where:

Q_{aa} = mean annual runoff in cfs
P = mean basin precipitation in inches
A = drainage basin area in square miles

DNRC estimated mean precipitation from maps published by the SCS (undated). Drainage area was planimetered from USGS topographic maps.

Potts' method applies only to streams that are hydrologically similar to those streams used in his correlation. Potts has not identified streams used, but states they "included 140 streams with adequate discharge records." DNRC assumed that most of these are long-term USGS gauging stations. It is likely that some of these streams have significant irrigation diversions or storage projects while others may have neither.

It is also likely that some streams considered in DNRC's analysis are *not* similar to streams used by Potts. Stuart Mill Creek, with a drainage area of only 0.15 square miles, would have an estimated mean annual flow of 0.1 cfs using Potts' method. In fact, SCS records for Stuart Mill Creek show mean monthly flows for May through September ranging from 10.7 to 19.5 cfs. Groundwater inflow not accounted for in Potts' method is the likely source of this water. Similarly, water diverted into Flint Creek from other basins could skew the predicted mean annual flow. The results of DNRC's analysis are shown in Table 3-3.

Table 3-3. Estimated Mean Annual Runoff-Clark Fork Tributaries

Stream	Drainage[a] BasinArea (sq.miles)	Mean Annual Precipitation (inches)	Mean Annual Runoff (cfs)
Warm Springs Creek at Meyers Dam	110	24	49
Barker Creek	9.4	28	5.0
Cable Creek	7.1	19	2.6
Storm Lake Creek	9.6	30	5.5
Twin Lakes Creek	21	34	13
Lost Creek	61	18	21
Racetrack Creek at U.S. Forest Service Boundary	42	18	15
Dempsey Creek	38	26	19
Little Blackfoot River			
at Dog Creek	100	22	42
at mouth	410	23	180
Snowshoe Creek	16	18	5.4
Dog Creek	58	20	22
Gold Creek	64	21	26
Flint Creek at mouth	290	19	110
North Fork of Flint Creek	10	23	4.5
Stuart Mill Creek	0.15	20	0.1
Harvey Creek	41	23	18

Table 3-1. Flint Creek Water Availability--Demand Model

Existing Conditions

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Lower Willow Creek at Mouth (cfs)												
Average	25.3	14.5	8.0	5.6	5.0	6.4	19.7	95.3	37.9	13.5	16.9	32.9
90 Percentile	20.6	12.1	7.4	5.6	5.0	5.0	5.0	26.6	10.1	5.7	7.4	24.0
80 Percentile	23.5	13.5	7.8	5.6	5.0	5.0	5.0	63.3	10.1	6.9	9.3	27.1
60 Percentile	26.0	14.8	8.0	5.6	5.0	5.0	5.0	78.9	10.1	11.0	13.8	32.2
50 Percentile	**26.7**	**15.2**	**8.1**	5.6	5.0	5.0	5.0	**87.6**	**10.9**	**13.2**	**15.8**	**33.7**
20 Percentile	28.0	15.8	8.4	5.6	5.0	5.0	35.0	141.9	69.8	19.5	22.9	40.0
Minimum	5.0	5.0	5.0	5.0	5.0	5.0	5.0	14.6	4.9	4.8	5.3	13.4
Maximum	30.4	17.0	9.0	5.6	5.0	27.7	88.0	250.2	198.5	19.5	37.7	47.7
Flint Creek near Mouth (cfs)												
Average	197.3	149.2	113.2	93.3	99.0	111.5	166.8	405.6	407.9	87.5	55.2	168.1
90 Percentile	144.6	113.6	82.7	64.3	69.0	74.0	95.2	227.8	113.7	30.0	34.8	97.8
80 Percentile	154.3	119.2	89.5	72.8	78.5	84.0	111.6	270.7	196.3	33.7	38.1	119.9
60 Percentile	177.7	133.2	102.7	86.4	86.0	100.8	132.4	339.2	289.5	36.3	41.0	153.7
50 Percentile	**201.0**	**147.0**	**114.0**	**92.0**	**92.0**	**110.0**	**150.0**	**379.0**	**346.0**	**37.0**	**44.0**	**163.0**
20 Percentile	235.6	178.2	132.4	114.1	121.9	145.1	212.8	530.6	679.1	127.3	63.0	226.2
Minimum	121.7	104.7	77.5	53.5	53.6	61.1	78.0	165.5	45.4	22.6	20.8	57.1
Maximum	298.2	217.8	200.0	146.8	152.2	166.7	352.3	995.6	952.1	515.4	228.5	276.6

Table 3-1. (con'd)

With GCD's Proposed North Fork of Lower Willow Creek Project

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Lower Willow Creek at Mouth (cfs)												
Average	29.9	16.9	9.3	5.9	5.2	5.5	13.0	65.5	28.3	13.9	25.6	38.7
90 Percentile	23.0	13.3	7.7	5.7	5.0	5.0	5.0	14.8	10.1	6.7	8.4	22.9
80 Percentile	27.1	15.4	8.4	5.7	5.0	5.0	5.0	39.5	10.1	8.5	11.9	29.3
60 Percentile	31.0	17.4	9.2	5.7	5.0	5.0	5.0	50.8	10.1	12.4	25.6	36.2
50 Percentile	**32.0**	**17.9**	9.4	5.7	5.0	5.0	5.0	**57.7**	10.1	**13.2**	**28.3**	**38.4**
20 Percentile	34.0	18.9	9.9	5.9	5.0	5.0	19.6	98.2	42.3	19.5	37.0	49.4
Minimum	5.0	5.0	5.0	5.0	5.0	5.0	5.0	14.6	7.4	4.9	5.4	13.3
Maximum	34.0	18.9	17.7	13.0	12.7	22.7	66.2	212.4	156.6	19.5	42.1	55.1
Flint Creek near Mouth (cfs)												
Average	202.2	151.7	114.5	93.7	99.2	110.6	160.1	375.7	398.3	87.7	61.0	174.7
90 Percentile	148.3	116.2	84.2	64.9	69.0	74.0	95.2	210.2	113.7	30.6	35.4	100.2
80 Percentile	158.6	121.8	90.2	72.9	78.5	84.0	111.6	247.5	195.1	33.7	39.5	123.1
60 Percentile	183.0	134.5	104.0	86.7	86.0	90.7	129.9	315.6	289.2	36.8	46.9	180.9
50 Percentile	**205.2**	**150.5**	**115.2**	**91.8**	**92.4**	**110.2**	**146.7**	**353.3**	**346.4**	**37.0**	**98.4**	**173.3**
20 Percentile	241.1	181.1	133.6	114.4	122.3	144.6	196.1	489.8	655.5	127.3	70.9	230.6
Minimum	123.2	105.9	77.8	53.6	53.6	61.1	78.0	165.5	48.0	22.6	20.8	55.8
Maximum	301.8	219.7	208.7	154.2	152.2	167.7	330.5	957.8	910.2	515.4	232.9	289.3

3) Flint Creek Near Mouth

-- With Proposed Boulder Creek and North Fork of Lower Willow Creek Projects --

	OCT (cfs)	NOV (cfs)	DEC (cfs)	JAN (cfs)	FEB (cfs)	MAR (cfs)	APR (cfs)	MAY (cfs)	JUN (cfs)	JUL (cfs)	AUG (cfs)	SEP (cfs)	ANNUAL (af)
Average	203	145	106	85	92	104	152	348	368	74	73	192	117,193
80 Percent	167	119	82	63	68	77	102	214	166	36	50	149	78,057
50 Percent	**206**	144	**106**	**81**	**83**	**99**	**135**	**303**	**307**	**40**	**69**	**193**	**106,361**
20 Percent	235	165	124	104	120	131	195	476	626	93	89	234	156,284

Table 3-2. Instantaneous Measurements (cfs) for Selected Streams Near Their Mouths

Source: Ingman 1990, DHES 1989a, USGS 1988, 1989,

Warm Springs Creek		Lost Creek		Racetrack Creek		Dempsey Creek		Gold Creek		Flint Creek	
DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
07/14/76	108.74	08/24/78	29.30	10/05/78	36.20	09/29/78	5.00	09/29/75	17.60	03/27/74	175.00
07/21/77	4.33	09/13/78	5.00	11/16/78	18.60	11/16/78	9.10	04/19/78	20.00	08/22/78	105.00
08/02/77	0.80	10/05/78	52.80	03/15/79	26.20	03/14/79	15.30	08/23/78	27.00	08/24/78	113.00
08/09/77	1.52	11/16/78	50.00	07/12/88	1.60	07/12/88	1.20	11/15/78	26.61	10/06/78	249.00
08/22/77	0.10	03/15/79	67.00	08/16/88	1.80	08/16/88	1.50	03/15/79	28.00	11/16/78	157.60
08/29/77	3.12	07/11/88	2.00	09/13/88	0.90	09/13/88	2.20	04/18/79	24.90	03/15/79	160.00
09/12/77	5.15	08/15/88	3.80	10/12/88	1.90	10/12/88	1.90	08/09/79	15.83	04/18/79	166.00
09/18/77	8.83	09/12/88	6.20	11/15/88	0.90	11/15/88	2.00	08/22/79	13.37	08/22/79	30.84
08/22/78	390.00	10/11/88	23.30	12/13/88	12.90	12/13/88	8.30	09/19/79	17.00	09/19/79	89.00
08/24/78	1.09	11/14/88	39.40	01/17/89	12.60	01/17/89	4.50	10/24/79	15.00	10/24/79	152.00
10/05/78	56.00	12/12/88	40.50	03/21/89	12.20	03/21/89	6.60	11/20/79	16.43	11/20/79	117.00
11/15/78	31.90	01/17/89	32.80	04/06/89	7.60	04/06/89	7.50	02/25/86	892.00	05/08/84	100.90
03/15/79	42.10	03/20/89	39.30	04/19/89	1.50	04/19/89	2.80	07/12/88	17.00	05/15/84	325.00
		04/06/89	41.70	05/03/89	1.50	05/03/89	1.90	08/16/88	4.10	05/22/84	270.00
		04/18/89	37.80	05/17/89	1.60	05/17/89	1.60	09/13/88	7.90	05/30/84	284.00
		05/02/89	35.20	05/31/89	1.70	05/31/89	1.20	10/12/88	11.00	06/05/84	305.00
		05/16/89	13.90	06/15/89	4.90	06/15/89	2.10	11/15/88	10.70	06/12/84	339.00
		05/30/89	4.10	06/27/89	4.00	06/27/89	2.40	12/13/88	17.20	06/19/84	325.00
		06/14/89	2.20					01/17/89	8.40	07/03/84	205.00
		06/26/89	2.70					03/21/89	10.50	02/25/86	892.00
								04/06/89	400.00	04/15/86	214.00
								04/19/89	31.80	05/28/86	386.00
								05/03/89	41.90	04/29/87	102.00
								05/17/89	49.90	05/27/87	101.00
								05/31/89	5.60	07/11/87	93.00
								06/15/89	27.10	07/19/87	151.00
								06/27/89	17.90	09/02/87	7.60
										04/20/88	114.00
										07/12/88	29.40
										08/16/88	9.70
										09/13/88	13.70
										10/12/88	38.80
										11/15/88	91.30
										12/13/88	100.20
										01/17/89	150.00
										03/21/89	128.90
										04/06/89	295.00
										04/19/89	350.00
										05/03/89	180.90
										05/17/89	120.70
										05/31/89	33.50
										06/15/89	65.50
										06/27/89	17.40

WATER QUALITY

Adoption of New Water Quality Standards

While the draft EIS was nearing completion, BHES adopted new water quality standards (ARM 16.20.601, *et seq.*). Under the new standards, concentrations of toxic or deleterious substances cannot exceed levels set forth in EPA's *Quality Criteria for Water 1986*, also known as the 1986 "Gold Book" (EPA 1986), and *Update #2* (EPA 1987) (ARM 16.20.601, *et seq.*). In particular, new standards were set for arsenic, copper, and zinc; these will have a bearing on the proposed reservations.

Arsenic

BHES's new instream standard for arsenic is based on the risk of human cancer occurrence and does not allow arsenic concentrations in surface water to exceed a level which would cause more than one additional cancer case per one million people exposed. The standard adopted by BHES and EPA is 2.2 nanograms per liter (ARM 16.20.601, *et seq.*). Recent research indicates that a concentration of 20 nanograms per liter more accurately reflects the cancer risk rate of one case per million people. The EPA is expected to raise the legal standard to 20 nanograms per liter in the near future, and the BHES standard will be adjusted accordingly (Horpestad 1990). If background levels in surface waters exceed 20 nanograms per liter, then the state standard would prohibit any increase in arsenic concentrations, caused either by depleting water available for dilution without a concurrent decrease in arsenic load or by adding arsenic.

Water samples taken by DHES, USGS, and DNRC found arsenic at levels exceeding the 2.2 nanograms per liter standard in the Clark Fork and some of its tributaries, including Flint Creek, Lost Creek, Dempsey Creek, Racetrack Creek, Warm Springs Creek, and the Little Blackfoot River (see Tables 3-4 and 3-5). A previous study (Ingman and Bahls 1979) indicates that tributaries to Flint Creek near Philipsburg contribute arsenic to Flint Creek. Further downstream, however, Boulder and Willow creeks contribute relatively clean water to Flint Creek. When storing water, GCD's proposed projects on Boulder and the North Fork of Lower Willow creeks would deplete the relatively clean flows entering Flint Creek from these streams. Project depletions occurring in Flint Creek when arsenic levels exceed 20 nanograms per liter would violate the state standard. This would be a likely occurrence for both projects.

In the upper Clark Fork main stem, total arsenic levels tend to increase as suspended sediment levels increase (figures 3-1 and 3-2) (USGS 1989). The amount of suspended sediment is related to flows. As flows start to increase and wash metals-laden soils from the floodplain into the stream, suspended sediment levels also increase. However, the highest flows do not always produce the highest levels of suspended sediment (figures 3-3 and 3-4).

Table 3-4. Surface-water Arsenic Levels in the Flint Creek Area.[a]

	Date	Arsenic (milligrams per liter)[b]
Clark Fork at Gold Creek	3-5-90	0.009
	5-10-90	0.008
Flint Creek above Boulder Creek	3-5-90	0.026
	5-10-90	0.015
Flint Creek near New Chicago	3-5-90	0.010
	5-10-90	0.009
Boulder Creek below dam site	5-10-90	[c]
Boulder Creek at Princeton	3-5-90	0.001
South Boulder Creek below Wyman Gulch	3-5-90	[c]
	5-10-90	[c]
Boulder Creek near Maxville	3-5-90	[c]
	5-10-90	[c]
Lower Willow Creek at dam outlet	5-10-90	0.005
Lower Willow Creek near mouth	5-10-90	0.005

[a]Samples were fixed with acid when collected and analyzed by the DHES lab in Helena.
[b]Total recoverable arsenic concentrations. 2.2 nanograms is 0.0000022 milligrams per liter.
[c]Below the DHES laboratory's detectable limit of 0.001 mg/l.

Table 3-5. Average monthly concentrations of total recoverable arsenic in the upper Clark Fork main stem.

Below Warm Springs Creek

MONTH	NUMBER OF SAMPLES	AVERAGE CONCENTRATION OF TOTAL RECOVERABLE ARSENIC (mg/l)
JAN	4	0.007
FEB	6	0.013
MAR	6	0.011
APR	8	0.016
MAY	7	0.017
JUN	8	0.023
JUL	5	0.024
AUG	5	0.014
SEP	5	0.008
OCT	5	0.006
NOV	3	0.008
DEC	5	0.008

Near Dempsey

MONTH	NUMBER OF SAMPLES	AVERAGE CONCENTRATION OF TOTAL RECOVERABLE ARSENIC (mg/l)
JAN	2	0.008
FEB	3	0.040
MAR	2	0.016
APR	5	0.012
MAY	6	0.017
JUN	6	0.026
JUL	4	0.021
AUG	4	0.023
SEP	2	0.013
OCT	2	0.008
NOV	1	0.010
DEC	2	0.009

Near Deer Lodge

MONTH	NUMBER OF SAMPLES	AVERAGE CONCENTRATION OF TOTAL RECOVERABLE ARSENIC (mg/l)
JAN	10	0.012
FEB	12	0.037
MAR	10	0.014
APR	14	0.025
MAY	14	0.022
JUN	12	0.023
JUL	13	0.017
AUG	12	0.016
SEP	8	0.012
OCT	12	0.011
NOV	8	0.010
DEC	9	0.009

(Table 3-5. con'd)

Above Little Blackfoot River

MONTH	NUMBER OF SAMPLES	AVERAGE CONCENTRATION OF TOTAL RECOVERABLE ARSENIC (mg/l)
JAN	4	0.010
FEB	7	0.022
MAR	5	0.013
APR	7	0.014
MAY	8	0.019
JUN	8	0.023
JUL	5	0.021
AUG	4	0.018
SEP	4	0.018
OCT	4	0.010
NOV	3	0.011
DEC	4	0.010

Near Gold Creek

MONTH	NUMBER OF SAMPLES	AVERAGE CONCENTRATION OF TOTAL RECOVERABLE ARSENIC (mg/l)
JAN	2	0.007
FEB	3	0.041
MAR	2	0.011
APR	5	0.010
MAY	6	0.012
JUN	6	0.018
JUL	4	0.015
AUG	1	0.014
SEP	2	0.014
OCT	2	0.008
NOV	1	0.008
DEC	2	0.007

At Bonita

MONTH	NUMBER OF SAMPLES	AVERAGE CONCENTRATION OF TOTAL RECOVERABLE ARSENIC (mg/l)
JAN	2	0.008
FEB	3	0.020
MAR	2	0.014
APR	5	0.010
MAY	6	0.013
JUN	6	0.017
JUL	4	0.013
AUG	1	0.011
SEP	2	0.013
OCT	2	0.008
NOV	1	0.008
DEC	2	0.008

Table 3-5. con'd

At Turah

MONTH	NUMBER OF SAMPLES	AVERAGE CONCENTRATION OF TOTAL RECOVERABLE ARSENIC (mg/l)
JAN	4	0.008
FEB	4	0.013
MAR	4	0.010
APR	6	0.007
MAY	7	0.011
JUN	18	0.006
JUL	29	0.008
AUG	2	0.006
SEP	3	0.008
OCT	4	0.006
NOV	3	0.006
DEC	3	0.006

FIGURE 3-1.

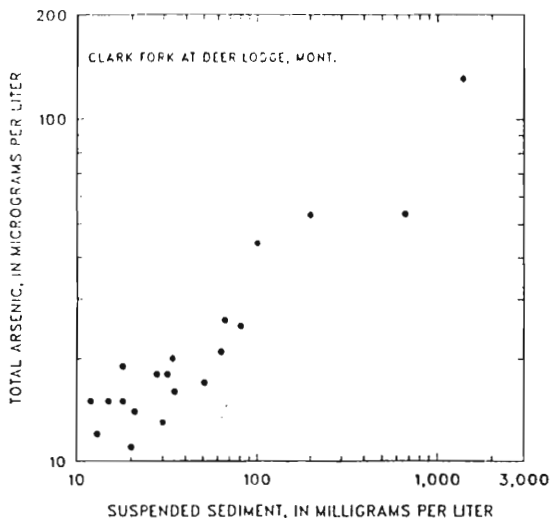
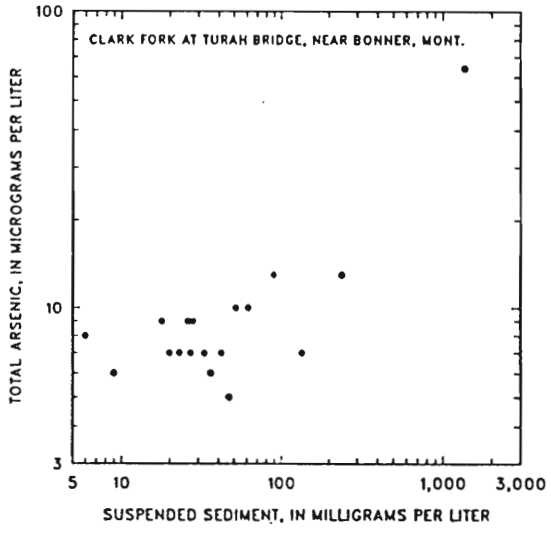
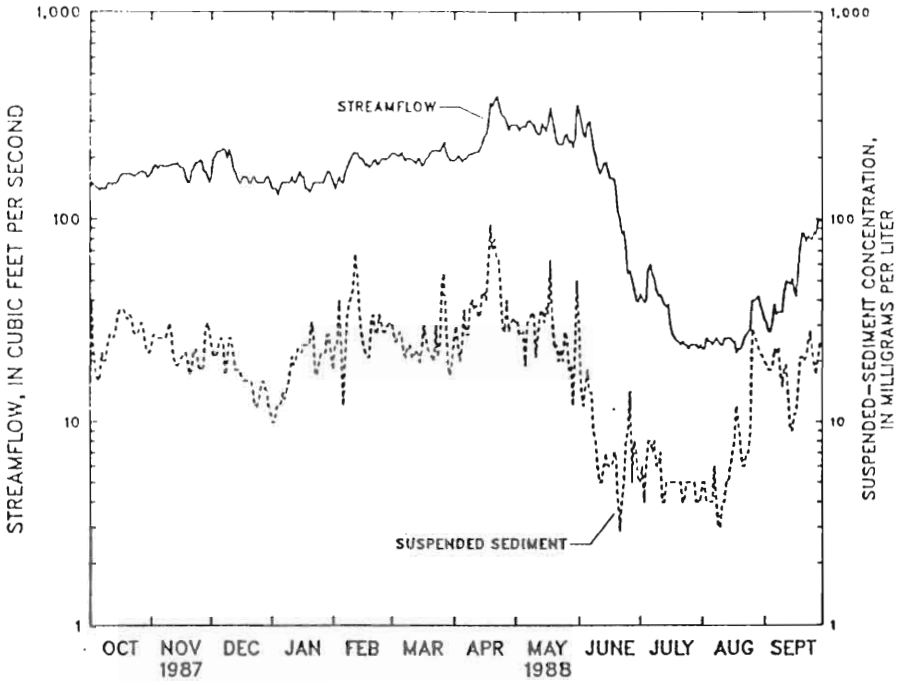


FIGURE 3-2.



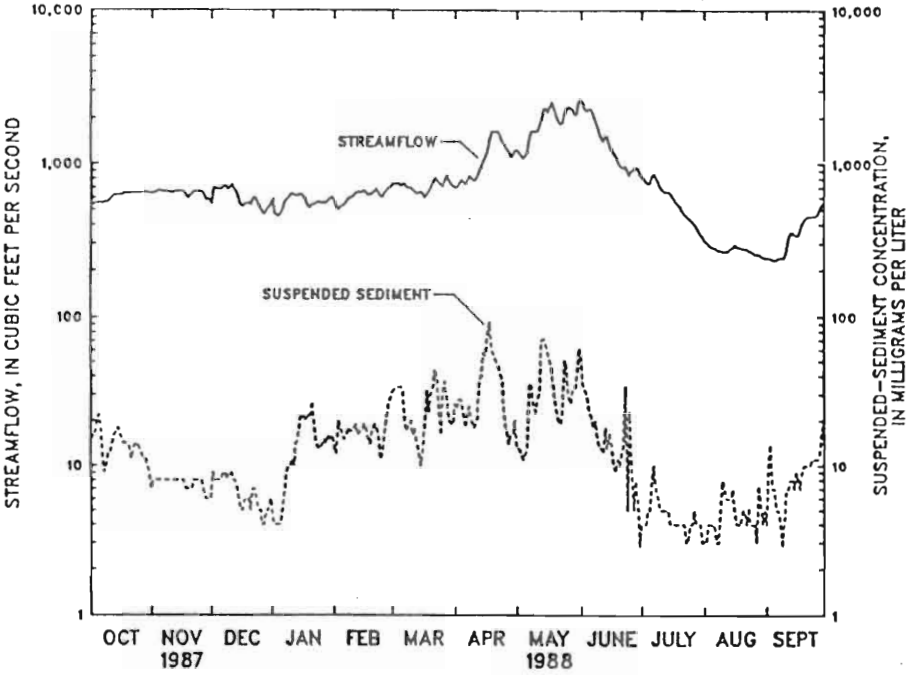
Relation of concentrations of total arsenic to suspended sediment, March 1985 through September 1988.
Source: USDI

FIGURE 3-3.



Daily mean streamflow and suspended-sediment concentration for the Clark Fork at Deer Lodge, October 1987 through September 1988.
Source: USDI 1989

FIGURE 3-4.



Daily mean streamflow and suspended-sediment concentration for the Clark Fork at Turah Bridge, near Bonner, October 1987 through September 1988.
Source: USDI 1989

Copper

The Gold Book (EPA 1986) lists copper toxicity criteria pertaining to freshwater aquatic life for 1-hour and 4-day exposures. These short-term (acute) and long-term (chronic) exposure criteria are based on water hardness. The current criteria are defined as follows: "...freshwater aquatic organisms and their uses should not be affected unacceptably if the 4-day average concentration (in µg/L) of copper does not exceed the numerical value given by:

$$e^{(0.8545[\ln(\text{hardness})]-1.465)}$$

more than once every three years on the average, and if the 1-hour average concentration (in µg/L) does not exceed the numerical value given by:

$$e^{(0.9422[\ln(\text{hardness})]-1.464}$$

more than once every three years on the average" (EPA 1986).

Prior to 1982, water quality sampling on the upper Clark Fork was sporadic. From 1982 to August 1985, monthly monitoring was conducted at a small network of stations on the upper Clark Fork. Since September 1985, water quality data have been collected systematically once a month during most of the year and at a minimum of 15 monitoring stations from Silver Bow Creek at Butte to the Clark Fork below Milltown Dam. Since 1985, samples were taken twice a month during the spring. Recently, more intense sampling has been done in conjunction with some of the Superfund investigations. Because water quality in the upper Clark Fork has not been continuously monitored, it is impossible to determine precisely how often the 4-day average copper concentration has exceeded the EPA long-term exposure criterion.

Some data on exceedances of short- and long-term (or acute and chronic) copper standards is available, however. Table 3-6 lists the percentage of water samples exceeding the short- and long-term standards for copper in the upper Clark Fork. It was assumed that single water samples fairly represent the 1-hour and 4-day average copper concentrations. This assumption is reasonable because copper concentrations tend not to change dramatically except during thunderstorms, rapid snowmelt, or periods of otherwise rapidly changing flows.

Copper concentrations and water hardness data for the Clark Fork main stem were obtained from DHES files (DHES 1989a). Data covered the years from 1975 to 1989 for the following sampling points: below Warm Springs Creek, near Dempsey, at Deer Lodge, above the Little Blackfoot River, at Gold Creek, at Bonita, and at Turah. Calculations of the standards for short- and long-term exposure were made using the formulas listed above. The data are used only to show general trends. The results indicate that copper levels exceed water quality standards for aquatic life most frequently during the winter and spring on the Clark Fork above the Little Blackfoot River. Winter increases in copper concentrations are due, at least in part, to less efficient removal of copper at the Warm Springs Ponds. Spring concentrations are high because runoff resuspends or carries copper-laden sediments into the main stem. In the Clark Fork below the Little Blackfoot River, water quality standards for copper are exceeded most often during spring runoff. These standards also appear to be exceeded on upper Clark Fork tributaries, as indicated in Appendix B of this final EIS.

Table 3-6. Copper Levels for the Clark Fork Above and Below the Little Blackfoot River.

Clark Fork Above the Little Blackfoot River

	Total Number Samples	Percentage of Samples Exceeding Chronic Standard	Percentage of Samples Exceeding Acute Standard
January	33	42%	12%
February	31	71%	48%
March	32	91%	41%
April	47	64%	28%
May	59	64%	36%
June	49	63%	39%
July	39	13%	8%
August	27	7%	0%
September	26	23%	8%
October	28	11%	4%
November	23	13%	9%
December	27	11%	7%

Table 3-6 con'd

Clark Fork Below the Little Blackfoot River

	Total Number Samples	Percentage of Samples Exceeding Chronic Standard	Percentage of Samples Exceeding Acute Standard
January	15	0%	0%
February	18	56%	44%
March	17	47%	24%
April	27	22%	4%
May	41	59%	27%
June	32	63%	38%
July	20	15%	10%
August	12	0%	0%
September	18	17%	0%
October	13	0%	0%
November	10	0%	0%
December	12	8%	0%

Zinc

The Gold Book (EPA 1986) lists zinc toxicity criteria pertaining to freshwater aquatic life for 1-hour and 4-day exposures. These short-term (acute) and long-term (chronic) exposures are based on water hardness. The current criteria are defined as follows: "...freshwater aquatic organisms and their uses should not be affected unacceptably if the 4-day average concentation of zinc (in g/L) does not exceed the numerical value given by:

$$e^{(0.8473[\ln (\text{hardness})] + 0.8604)}$$

more than once every three years on the average and if the 1-hour average concentration (in g/L) does not exceed the numerical value given by:

$$e^{(0.8473[\ln (\text{hardness})] + 0.8604)}$$

more than once every three years on the average" (EPA 1986). In general terms, zinc becomes less toxic as water hardness increases.

Zinc, like copper, has not been continuously monitored in the Clark Fork. Consequently, it is impossible to determine precisely how often the 4-day average zinc concentration has exceeded the EPA criterion. However, the instantaneous measurements of zinc were assumed to represent the 4-day average concentration when calculating whether the EPA criterion was exceeded. This is a valid assumption most of the time but does not hold true when flow rates change rapidly during thunderstorms, the onset of spring runoff, or in similar conditions.

Table 3-7 lists the percentage of time the chronic and acute standards for zinc were exceeded in the Clark Fork above and below the Little Blackfoot River. The calculations are based on measurements of zinc made between 1975 and 1989 at the following locations on the Clark Fork: below Warm Springs Creek, near Dempsey, at Deer Lodge, above the Little Blackfoot River, at Gold Creek, near Bonita, and near Turah. The tables show that the water quality standards for zinc are occasionally exceeded during the winter and spring at all ponts along the Clark Fork. However, zinc does not appear to pose as great a problem to aquatic life as copper. When zinc concentrations exceeded the new standards in the winter below the Little Blackfoot River, flows were very high in the Clark Fork. This period of high flow and associated high concentrations occurred once during late March 1986, and samples taken during this period give the appearance of more of a zinc problem than actually exists.

Table 3-7. Zinc Levels for the Clark Fork Above and Below the Little Blackfoot River.

Clark Fork Above the Little Blackfoot River

	Total Number Samples	Percentage of Samples Exceeding Chronic Standard	Percentage of Samples Exceeding Acute Standard
January	32	3%	3%
February	30	13%	13%
March	31	3%	3%
April	47	2%	2%
May	58	5%	3%
June	49	6%	2%
July	39	5%	3%
August	27	0%	0%
September	26	0%	0%
October	29	0%	0%
November	22	0%	0%
December	27	0%	0%

Clark Fork Below the Little Blackfoot River

	Total Number Samples	Percentage of Samples Exceeding Chronic Standard	Percentage of Samples Exceeding Acute Standard
January	15	0%	0%
February	18	33%	33%
March	17	0%	0%
April	28	0%	0%
May	41	7%	5%
June	34	0%	0%
July	20	0%	0%
August	12	0%	0%
September	18	0%	0%
October	13	0%	0%
November	10	0%	0%
December	12	0%	0%

Nutrients

Since the draft EIS was published, Ingman (1990) conducted a study to identify the major point and nonpoint sources of nutrients entering the Clark Fork. A network of monitoring stations was established from the headwaters to Idaho that included 24 stations on Silver Bow Creek and the Clark Fork River, 17 stations at the mouths of tributaries, and 10 stations below the discharges of municipal or industrial pollution. Samples were collected 15 times during the year and analyzed for inorganic and bioavailable forms of phosphorous and nitrogen. Data from this study are summarized in Table 3-8. Table 3-9 ranks the nutrient sources in the Clark Fork based on mean nutrient concentration. Gold Creek was found to be a major source of bioavailable phosphorous. Ingman (1990) and Carey (1990) suggest the phosphorous in Gold Creek originates from natural sources. Of the wastewater treatment plants that were monitored in the upper Clark Fork, Butte and Deer Lodge were major contributors of nutrient load. Much of the nutrient load from Butte was attenuated by the Warm Springs Ponds before it reaches the Clark Fork. The study found that the relative contribution of nutrients from wastewater treatment plants increased as flows were decreased. This implies that it is important to maintain flows in the Clark Fork in order to dilute the nutrient load from the wastewater discharge plants in the upper basin. Flint Creek also was shown to be a significant source of nutrients. Flint Creek receives wastewater discharges from the town of Philipsburg and nonpoint nutrient loads from agricultural return flows. Nutrient concentrations from the other headwater tributary streams monitored in this study (Dempsey Creek, Racetrack Creek, and Lost Creek) also are thought to be influenced by agricultural practices to some degree.

Ingman (1990) also showed that the EPA guideline for the prevention of nuisance algae growth due to ***phosphorous*** was often exceeded during the year-long study period in the upper Clark Fork (Figure 3-5). The EPA guideline for the prevention of nuisance algae growth due to ***nitrogen*** was not exceeded (Figure 3-6).

Table 3-8. July 1988 - June 1990 Clark Fork Basin Nutrient Concentration Data Summary.

Number	N=	Measured Concentration (µg/l) July 1988 through June 1989 Soluable Reactive Phosphorous Range	Mean	Total Phosphorous Range	Mean	Total Soluable Inorganic Nitrogen Range	Mean	Total Nitrogen Range	Mean
I. Mainstem Stations									
Silver Bow Creek above Butte WWTP	15	9 - 55	19	58 - 129	94	760 - 2110	1717	1320 - 2500	2055
Silver Bow Creek below Colorado Tailings	15	526 - 1180	893	1040 - 1890	1440	2850 - 5670	4632	3750 - 6240	5315
Silver Bow Creek at Miles Crossing	15	76 - 645	344	610 - 1230	836	1870 - 5390	3437	2540 - 5600	3894
Silver Bow Creek at frontage road above Warm Springs ponds	15	36 - 284	146	259 - 998	523	820 - 3230	2085	1290 - 3460	2612
Discharge from AMC Pond 2 (Silver Bow Creek)	15	1 - 137	40	40 - 320	123	<10 - 1220	396	320 - 2140	904
Clark Fork below Warm Springs Creek	15	<1 - 70	21	21 - 112	62	30 - 840	284	230 - 1340	659
Clark Fork near Dempsey	15	2 - 18	11	24 - 135	51	<10 - 690	215	250 - 1340	607
Clark Fork at Deer Lodge	15	2 - 15	7	12 - 133	51	40 - 660	306	270 - 1390	671
Clark Fork above Little Blackfoot River	15	8 - 92	36	53 - 165	91	<10 - 740	255	210 - 1410	693
Clark Fork at Gold Creek Bridge	15	10 - 84	30	38 - 133	72	<10 - 590	187	220 - 1170	546
Clark Fork at Bonita	15	6 - 53	21	18 - 180	60	<10 - 450	99	220 - 1120	496
Clark Fork at Turah	15	3 - 34	12	15 - 104	36	10 - 340	76	120 - 1020	359
Clark Fork below Milltown Dam	15	3 - 21	8	13 - 59	29	<10 - 190	47	<100 - 1130	325
Clark Fork above Missoula WWTP	15	2 - 20	8	15 - 57	29	<10 - 210	49	<100 - 1130	264
Clark Fork at Shuffield's	15	8 - 96	42	30 - 106	68	30 - 280	148	110 - 660	396
Clark Fork at Harper Bridge	15	7 - 23	14	20 - 60	41	30 - 230	103	<100 - 550	294
Clark Fork at Huson	15	8 - 29	16	23 - 108	47	<10 - 240	83	100 - 440	323
Clark Fork near Alberton	15	8 - 20	14	23 - 70	40	<10 - 220	62	<100 - 580	297
Clark Fork at Superior	15	6 - 21	9	15 - 79	31	<10 - 190	62	<100 - 320	218
Clark Fork above Flathead River	15	2 - 18	7	12 - 70	25	<10 - 120	38	<100 - 320	240
Clark Fork above Thompson Falls Reservoir	15	<1 - 13	3	7 - 59	18	<10 - 110	23	<100 - 260	108
Clark Fork below Thompson Falls Dam	15	<1 - 8	2	7 - 46	17	<10 - 100	19	<100 - 200	101
Clark Fork at Noxon Bridge	15	<1 - 14	4	8 - 45	16	<10 - 180	51	<100 - 250	191
Clark Fork below Cabinet Gorge Dam	15	<1 - 5	3	7 - 31	14	<10 - 150	43	<100 - 490	161
II. Tributaries									
Mill-Willow Bypass at mouth	15	<1 - 21	9	19 - 69	37	30 - 380	186	230 - 1050	517
Warm Springs Creek near mouth	15	<1 - 16	6	8 - 28	14	20 - 330	98	<100 - 1050	326
Lost Creek near mouth	15	2 - 17	6	7 - 68	29	<10 - 670	292	220 - 1600	607
Racetrack Creek near mouth	15	<1 - 42	8	11 - 66	19	120 - 360	210	140 - 108	412
Dempsey Creek near mouth	15	18 - 36	29	30 - 64	44	180 - 780	460	180 - 1050	649
Cottonwood Creek near mouth	15	9 - 120	30	19 - 156	49	<10 - 190	32	<100 - 600	261
Little Blackfoot R. at USGS station near mouth	15	10 - 93	20	25 - 750	68	<10 - 100	22	200 - 1370	336
Warm Springs Ck. (near Phosphate) near mouth	15	5 - 161	21	17 - 5940	303	<10 - 220	90	110 - 5920	561
Gold Creek near mouth	15	30 - 402	122	57 - 4330	336	10 - 550	122	<100 - 9500	844
Flint Creek near mouth	15	20 - 86	44	46 - 343	97	<10 - 350	100	200 - 1600	520
Rock Creek at USGS station near mouth	15	1 - 11	6	9 - 38	18	<10 - 40	16	<100 - 1020	209
Blackfoot River at USGS station near mouth	15	1 - 16	4	5 - 53	20	<10 - 440	54	<100 - 940	230
Bitterroot River at Hwy 93 crossing	15	<1 - 14	5	12 - 44	21	30 - 120	65	<100 - 870	277
Bitterroot River near mouth	15	2 - 8	5	11 - 44	22	40 - 130	69	<100 - 1260	311
Flathead River near mouth	15	<1 - 19	3	4 - 78	16	<10 - 120	24	<100 - 220	111
Thompson River at USGS station near mouth	15	<1 - 5	3	5 - 33	14	<10 - 40	16	<100 - 310	107
Prospect Creek at USGS station near mouth	15	<1 - 10	4	4 - 30	11	<10 - 60	22	<100 - 420	113
Butte Metro WWTP discharge	15	2200 - 3990	3099	3190 - 4470	3667	6810 - 11970	10160	8680 - 13960	11761
Warm Springs lagoon discharge	14	34 - 468	195	93 - 886	376	140 - 2250	987	110 - 4330	2628
Galen WWTP discharge	15	1290 - 4280	2712	1470 - 4500	3012	2580 - 11500	7414	4080 - 13000	9421
Deer Lodge lagoon discharge	15	954 - 2530	1828	1320 - 5250	2396	1330 - 8200	4856	4269 - 11420	7411
Drummond lagoon discharge	15	67 - 1110	613	298 - 7870	1412	10 - 4420	1837	910 - 4610	3153
Missoula WWTP discharge	15	2680 - 5300	4454	3250 - 6150	4789	10110 - 22850	15120	11460 - 41620	17201
Stone Container Corporation wastewater discharge	10	92 - 566	287	368 - 829	567	790 - 1990	1388	2400 - 8100	4522
Alberton lagoon discharge	15	2310 - 6210	4420	2730 - 6850	5118	5040 - 19540	13612	10430 - 23820	18046
Superior lagoon discharge	15	864 - 6880	5350	4940 - 9620	6471	12610 - 19780	16791	18270 - 27640	22160
Thompson Falls lagoon discharge	15	313 - 4220	2207	1710 - 4650	3140	10 - 17560	3737	5410 - 10550	7675

(a) Concentration data given are all totals. Stone wastewater is not filterable.
Source: Ingman 1990

Table 3-9. Ranking of Clark Fork Basin Nutrient Sources by Mean Concentrations of Phosphorus and Nitrogen

		Rank and Mean Concentration (µg/l)							
		Soluable Reactive Phosphorous		Total Phosphorous		Total Soluble Inorganic Nitrogen		Total Nitrogen	
I. Tributaries									
10.7	Gold Creek	1	(122)	1	(336)	5	(122)	1	(844)
11.5	Flint Creek	2	(44)	3	(97)	6	(100)	5	(520)
09.3	Cottonwood Creek	3	(30)	5	(49)	12	(32)	12	(261)
08.7	Dempsey Creek	4	(29)	6	(44)	1	(460)	2	(649)
10.5	Warm Springs Creek (near Phosphate)	5	(21)	2	(303)	8	(90)	4	(561)
10.2	Little Blackfoot River	6	(20)	4	(68)	14	(22)	8	(336)
05	Mill-Willow Bypass	7	(9)	7	(37)	4	(186)	6	(517)
08.3	Racetrack Creek	8	(8)	12	(19)	3	(210)	7	(412)
06	Warm Springs Creek (near Warm Springs)	9	(6)	15	(14)	7	(98)	9	(326)
07.3	Lost Creek	9	(6)	8	(29)	2	(292)	3	(607)
12.5	Rock Creek	9	(6)	13	(18)	15	(16)	14	(209)
18.5	Bitterroot River (at Hwy 93)	12	(5)	10	(21)	10	(65)	11	(277)
19	Bitterroot River (near mouth)	13	(5)	9	(22)	9	(69)	10	(311)
14	Blackfoot River	14	(4)	11	(20)	11	(54)	13	(230)
27.7	Prospect Creek	15	(4)	16	(11)	14	(22)	16	(113)
26	Flathead River	16	(3)	14	(16)	13	(24)	15	(111)
27.5	Thompson River	17	(3)	15	(14)	15	(16)	16	(107)
II. Wastewater Discharges									
24.5	Superior lagoon	1	(5350)	1	(6471)	1	(16791)	1	(22160)
17	Missoula WWTP	2	(4454)	3	(4789)	2	(15120)	3	(17201)
23.5	Alberton lagoon	3	(4420)	2	(5118)	3	(13612)	2	(18046)
00.5	Butte Metro WWTP	4	(3099)	4	(3667)	4	(10160)	4	(11761)
07.7	Galen WWTP	5	(2712)	6	(3012)	5	(7414)	5	(9421)
27.6	Thompson Falls lagoon	6	(2207)	5	(3140)	7	(3737)	6	(7675)
09.5	Deer Lodge lagoon	7	(1828)	7	(2396)	6	(4856)	7	(7411)
11.6	Drummond lagoon	8	(613)	8	(1412)	8	(1837)	9	(3153)
21	Stone Container Corporation	9	(287)	9	(567)	9	(1388)	8	(4522)
06.5	Warm Springs lagoon	10	(195)	10	(376)	10	(987)	10	(2628)

* Based on an average of 15 measurements made from July 1988 through June 1989.
Source: Ingman 1990

FIGURE 3-5. CLARK FORK BASIN MAIN STEM PHOSPHORUS CONCENTRATION

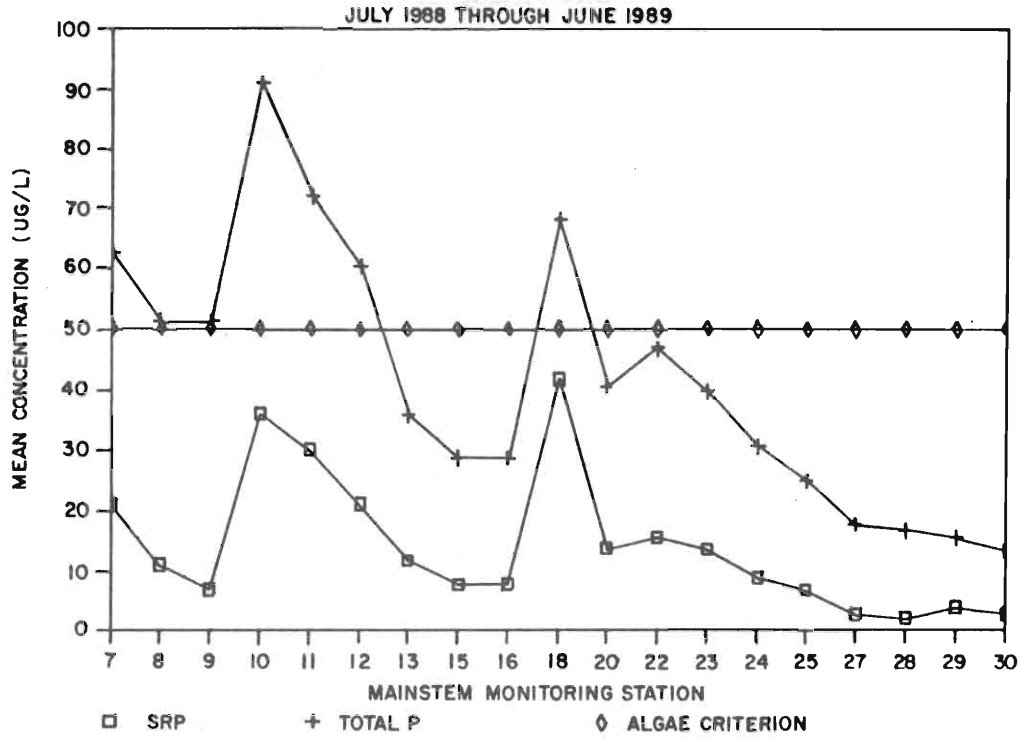
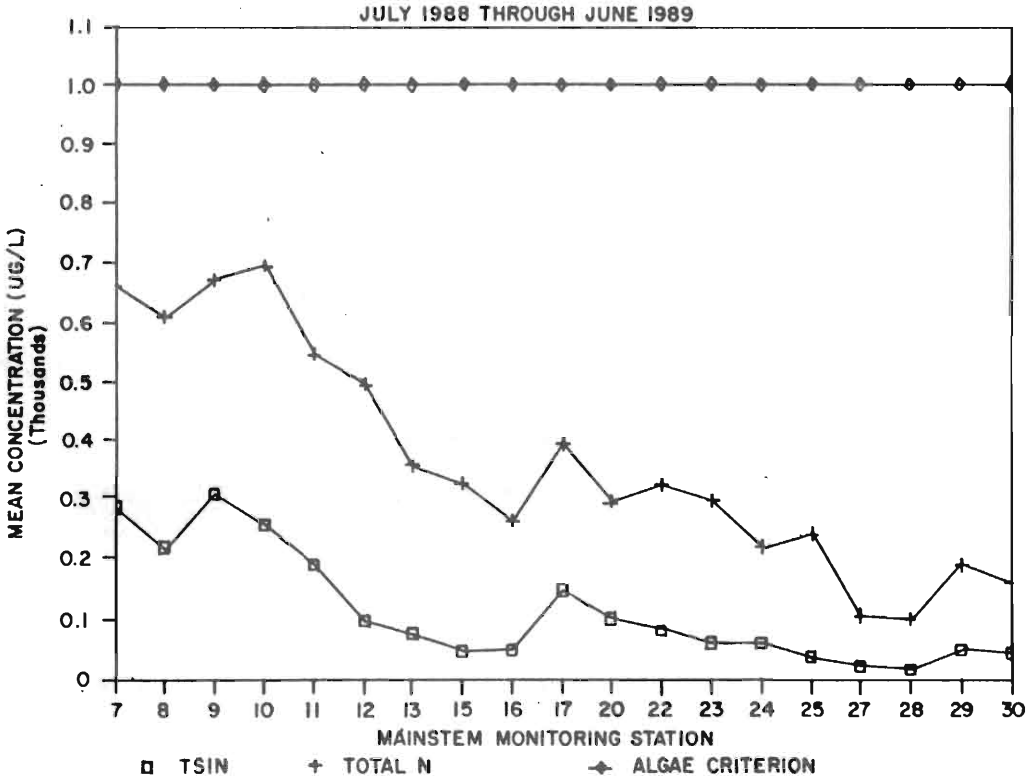


FIGURE 3-6. CLARK FORK BASIN MAIN STEM NITROGEN CONCENTRATION



UPDATED WATER QUALITY CLASSIFICATIONS

Since the draft EIS and addendum were prepared, DHES has revised its water quality classification system.

Following is a list of water-use descriptions for different water classifications in Montana (ARM 16.20.616-623).

16.20.616 A-CLOSED CLASSIFICATION: (1) Waters classified A-Closed are suitable for drinking, culinary and food processing purposes after simple disinfection.

16.20.617 A-1 CLASSIFICATION: (1) Waters classified A-1 are suitable for drinking, culinary and food processing purposes after conventional treatment for removal of naturally present impurities.

16.20.618 B-1 CLASSIFICATION: (1) Waters classified B-1 are suitable for drinking, culinary and food processing purposes, after conventional treatment; bathing, swimming and recreation; growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply.

16.20.619 B-2 CLASSIFICATION: Waters classified B-2 are suitable for drinking, culinary and food processing purposes, after conventional treatment; bathing, swimming and recreation; growth and marginal propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply.

16.20.620 B-3 CLASSIFICATION: (1) Waters classified B-3 are suitable for drinking, culinary and food processing purposes, after conventional treatment; bathing, swimming and recreation; growth and propagation of non-salmonid fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply.

16.20.621 C-1 CLASSIFICATION: Waters classified C-1 are suitable for bathing, swimming and recreation; growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply.

16.20.622 C-2 CLASSIFICATION: (1) Waters classified C-2 are suitable for bathing, swimming and recreation; growth and marginal propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply.

16.20.624 C-3 CLASSIFICATION: (1) Waters classified C-3 are suitable for bathing, swimming and recreation, growth and propagation of non-salmonid fishes and associated aquatic life, waterfowl and furbearers. The quality of these waters is naturally marginal for drinking, culinary and food processing purposes, agriculture and industrial water supply. Degradation which will impact established beneficial uses will not be allowed.

16.20.623 I CLASSIFICATION: (1) The goal of the state of Montana is to have these waters fully support the following uses: drinking, culinary, and food processing purposes after conventional treatment; bathing, swimming, and recreation; growth and propagation of fishes and associated aquatic life, waterfowl, and furbearers; and agricultural and industrial water supply.

PROJECT FEASIBILITY: A COMPARISON OF METHODS USED BY DNRC AND GCD

A number of comments were received regarding the differences between DNRC's and GCD's analyses of the economic feasibility of GCD's proposed projects. The differences can be explained by comparing the methods used by both parties.

DNRC and GCD's consultants both examined the economic feasibility of GCD's proposed projects. DNRC and GCD differed on the costs of the projects and the net returns from additional production that would be available to pay for the projects. DNRC identified four areas where its analysis of returns differed significantly from GCD's. These were yields, farm production costs, crop prices, and water availability from the proposed Lower Willow Creek project. DNRC re-analyzed the Lower Willow Creek project, using combinations of GCD's assumptions and DNRC's assumptions to identify the most important points of disagreement. The results would be similar for the Boulder Creek project except that both parties used the same assumptions about water availability on that project.

DNRC computed the net returns for 300 combinations of crop prices and water supply with corresponding yields and production costs. The results of this computation with five combinations of DNRC and GCD assumptions are shown in Table 3-10. The differences in prices and production costs each had relatively small effects, while the difference in assumed yields had a larger effect, and the difference in water supply had a larger effect than the other three combined.

Table 3-10. Increase in Net Returns Due to Project Using Different Assumptions.

Yields	On Farm Costs	Crop Prices	Water Supply	Average Annual Return Increase	% Runs Greater than: DNRC Cost	% Runs Greater than: GCD Cost
DNRC	DNRC	DNRC	DNRC	$ 26.96	0%	0%
GCD	DNRC	DNRC	DNRC	$ 40.19	0%	29%
GCD	GCD	DNRC	DNRC	$ 44.17	0%	47%
GCD	GCD	GCD	DNRC	$ 49.01	0%	63%
GCD	GCD	GCD	GCD	$123.81	0%	100%

GCD assumed that average yields from project lands would be at the high end of the range of observed yields in the area. DNRC used yield projections that are closer to average yields. GCD's farm cost analysis was based on high and low input operations, which indicated to DNRC that GCD did not expect all project participants to practice the level of management necessary to reach GCD's projected yields.

DNRC's production costs for GCD's full-service yields are within a few cents per ton of GCD's production costs. However, GCD's production cost per ton is much higher than DNRC's at GCD's partial service yields. This is because GCD used the same cost per acre regardless of the yield. But higher yields generally incur higher production costs. DNRC's production costs per acre are higher for higher yields. This reflects factors such as swathers and balers covering less ground per hour in harvesting a heavier crop and costs such as twine which depend primarily on yield rather than acreage.

GCD assumed constant prices of $68.87 per ton for alfalfa and $2.89 per bushel for grain. These were average prices from recent years. Both GCD and DNRC assumed that the supplemental irrigation water from the project would not affect grain yields, so that the price of grain does not affect the increase in returns due to the project. DNRC constructed a forecasting model to predict future alfalfa and grain prices based on past prices and other factors that have historically been related to prices. The main difference between the approaches is that DNRC's model takes into account the fact that alfalfa prices have historically been highly variable, with a few years of very high prices and many years of lower than average prices. DNRC also found that, as with other crops, the price of alfalfa has fallen overtime as production has increased.

DNRC's water availability analysis used a more sophisticated reservoir operation model than GCD's and took into account downstream water rights on Flint Creek. GCD's analysis did not take downstream water rights into account.

EFFECTS OF GCD'S PROPOSED PROJECTS ON HYDROPOWER PRODUCTION

Between publication of the draft EIS and the addendum, DNRC revised its estimates of the changes in flows that would result from GCD's proposed projects. The revised flow estimates for the Willow Creek project are found in Table 3-1. In addition, MPC is planning to upgrade its Thompson Falls facility. This will increase the amount of water that can be run through the turbines to 23,600 cfs. With flows exceeded 5 years in 10, the Thompson Falls dam will be able to use all available water except in May, June, and July. Until the powerplant is upgraded, April flows will be greater than can be used for power production 5 years in 10. The upgrade also will increase power production from each additional cfs to 3.6 kwh in April and 3.97 kwh in the other eight months when additional flows can be used for power production. Tables 3-11 through 3-16 show the effects of GCD's proposed projects on power production with these two changes.

Table 3-11. Change in Power Production Due to GCD's Proposed Project on Boulder Creek (in kWh).

	Milltown Falls	Thompson Falls as is	Thompson Rapids upgraded	Noxon Columbia System	rest of without upgrade	total with upgrade	total
OCT	1300	2600	3000	8800	86400	99100	99500
NOV	-7300	-15100	-17200	-51000	-502000	-575400	-577500
DEC	-11400	-23400	-26600	-79000	-778000	-891800	-895000
JAN	-13900	-28600	-32500	-96600	-951000	-1090100	-1094000
FEB	-10300	-21200	-24000	-71400	-702700	-805600	-808400
MAR	-13900	-28600	-32500	-96600	-951000	-1090100	-1094000
APRIL	0	0	-33700	-110500	-1087600	-1198100	-1231800
MAY	0	0	0	-360000	-3544500	-3904500	-3904500
JUNE	0	0	0	-297400	-2928200	-3225600	-3225600
JULY	0	0	0	26300	259400	285700	285700
AUG	15200	31300	35400	105400	1037400	1189300	1193400
SEP	24500	50400	57200	169900	1673300	1918100	1924900
Total	-15800	-32600	-70900	-852100	-8388500	-9289000	-9327300

Table 3-12. Change in Power Production Due to GCD's Proposed Project on the North Fork of Lower Willow Creek (in kWh).

	Milltown	Thompson Falls as is	Thompson Falls upgraded	Noxon Rapids	Rest of Columbia System	Total without upgrade	Total with upgrade
OCT	6300	13000	14800	35100	345800	400200	402000
NOV	3700	7600	8600	25500	251000	287800	288800
DEC	-1300	-2600	-3000	8800	86400	91300	90900
JAN	0	0	0	0	0	0	0
FEB	0	0	0	0	0	0	0
MAR	0	0	0	0	0	0	0
APRIL	0	0	-7800	-8500	-83700	-92200	-100000
MAY	0	0	0	-307300	-3025800	-3333100	-3333100
JUNE	0	0	0	-34000	-334640	-368640	-368640
JULY	0	0	0	0	0	0	0
AUG	5100	10400	11800	114100	1123900	1253500	1254900
SEP	12200	25200	28600	85000	836600	959000	962400
Total	26000	53600	53000	-81300	-800440	-802140	-802740

Table 3-13. Change in Power Production Due to Both Projects (in kWh).

	Milltown	Thompson Falls as is	Thompson Falls upgraded	Noxon Rapids	Rest of Columbia System	Total without upgrade	Total with upgrade
OCT	7600	15600	17800	43900	432200	499300	501500
NOV	-3600	-7500	-8600	-25500	-251000	-287600	-288700
DEC	-12700	-26000	-29600	-70200	-691600	-800500	-804100
JAN	-13900	-28600	-32500	-96600	-951000	-1090100	-1094000
FEB	-10300	-21200	-24000	-71400	-702700	-805600	-808400
MAR	-13900	-28600	-32500	-96600	-951000	-1090100	-1094000
APRIL	0	0	-41500	-119000	-1171300	-1290300	-1331800
MAY	0	0	0	-667300	-6570300	-7237600	-7237600
JUNE	0	0	0	-331400	-3262840	-3594240	-3594240
JULY	0	0	0	26300	259400	285700	285700
AUG	20300	41700	47200	219500	2161300	2442800	2448300
SEP	36700	75600	85800	254900	2509900	2877100	2887300
Total	10200	21000	-17900	-933400	-9188940	-1.0E+07	-1.0E+07

Table 3-14. Change in Power Production Due to GCD's Proposed Project on Boulder Creek (in $).

	Milltown	Thompson Falls as is	Thompson Falls upgraded	Noxon Rapids	Rest of Columbia System	Total without upgrade	Total with upgrade
OCT	29	57	66	194	1901	2180	2189
NOV	-161	-332	-378	-1122	-11044	-12659	-12705
DEC	-251	-515	-585	-1738	-17116	-19620	-19690
JAN	-306	-629	-715	-2125	-20922	-23982	-24068
FEB	-227	-466	-528	-1571	-15459	-17723	-17785
MAR	-306	-629	-715	-2125	-20922	-23982	-24068
APRIL	0	0	-741	-2431	-23927	-26358	-27100
MAY	0	0	0	-7920	-77979	-85899	-85899
JUNE	0	0	0	-6543	-64420	-70963	-70963
JULY	0	0	0	579	5707	6285	6285
AUG	334	689	779	2319	22823	26165	26255
SEP	539	1109	1258	3738	36813	42198	42348
Total	-348	-717	-1560	-18746	-184547	-204358	-205201

Table 3-15. Change in Power Production Due to GCD's Proposed Project on the North Fork of Lower Willow Creek (in $).

	Milltown	Thompson Falls as is	Thompson Falls upgraded	Noxon Rapids	rest of Columbia System	total without upgrade	total with upgrade
OCT	139	286	326	772	7608	8804	8844
NOV	81	167	189	561	5522	6332	6354
DEC	-29	-57	-66	194	1901	2009	2000
JAN	0	0	0	0	0	0	0
FEB	0	0	0	0	0	0	0
MAR	0	0	0	0	0	0	0
APRIL	0	0	-172	-187	-1841	-2028	-2200
MAY	0	0	0	-6761	-66568	-73328	-73328
JUNE	0	0	0	-748	-7362	-8110	-8110
JULY	0	0	0	0	0	0	0
AUG	112	229	260	2510	24726	27577	27608
SEP	268	554	629	1870	18405	21098	21173
Total	572	1179	1166	-1789	-17610	-17647	-17660

Table 3-16. Change in Power Production Due to Both Projects (in $).

	Milltown	Thompson Falls as is	Thompson Falls upgraded	Noxon Rapids	Rest of Columbia System	Total without upgrade	Total with upgrade
OCT	167	343	392	966	9508	10985	11033
NOV	-79	-165	-189	-561	-5522	-6327	-6351
DEC	-279	-572	-651	-1544	-15215	-17611	-17690
JAN	-306	-629	-715	-2125	-20922	-23982	-24068
FEB	-227	-466	-528	-1571	-15459	-17723	-17785
MAR	-306	-629	-715	-2125	-20922	-23982	-24068
APRIL	0	0	-913	-2618	-25769	-28387	-29300
MAY	0	0	0	-14681	-144547	-159227	-159227
JUNE	0	0	0	-7291	-71782	-79073	-79073
JULY	0	0	0	579	5707	6285	6285
AUG	447	917	1038	4829	47549	53742	53863
SEP	807	1663	1888	5608	55218	63296	63521
Total	224	462	-394	-20535	-202157	-222005	-222861

SECTION II - OTHER PLANNING EFFORTS

Several other resource planning and management efforts are underway in the upper Clark Fork basin. Those that could have a bearing on the requested reservations or be affected by them are described below.

EPA SUPERFUND CLEAN UP

DNRC received several comments regarding Superfund efforts to clean up the portion of the Clark Fork which stretches from Butte to the Milltown Dam. The clean-up effort would influence DFWP's request for all instantaneous base flows from January 1 to April 30 to provide dilution flows from 17 tributaries to the Clark Fork main stem. If the clean up is successful and copper and zinc concentrations reach acceptable levels, DFWP's reservations would be reduced to the amount granted year-round to protect aquatic habitat and fisheries values. The following update of Superfund activities was excerpted from the May 1990 issue of *Progress*, a newsletter published by DHES and EPA.

Introduction

Superfund remediation activities are progressing at a rapid pace this spring in the Clark Fork Basin Superfund sites. Major events include accelerated cleanup of the Mill-Willow Bypass, emergency soils removal in Butte, and a study of the Colorado Tailings, which is scheduled for cleanup in 1991. More than 100 years of mining have left a hazardous legacy along Silver Bow Creek and the Clark Fork. Millions of tons of tailings, rich in heavy metals, have contaminated soils, groundwater and surface water. Planned remediation activities will lessen the contribution of metals to soils and waters.

The U.S. Environmental Protection Agency (EPA) and the Montana Department of Health and Environmental Sciences (MDHES) investigate and clean up Superfund sites in Montana. Periodically, the agencies produce public information on site activities. This progress report summarizes current Clark Fork Basin Superfund activities, where the public can obtain more information and how they can get more involved in the Superfund process.

Clark Fork Sites Have Colorful History

Four Superfund sites lie in the Clark Fork Basin from Butte to Missoula, 138 river miles. The Clark Fork sites include the Silver Bow Creek/Butte Area, Montana Pole, Anaconda Smelter and Milltown. Except for the Montana Pole site, contamination at the sites is primarily mining wastes and heavy metals-laden soils and water. The Montana Pole site which lies adjacent to the Silver Bow Creek/Butte Area site in southwestern Butte is contaminated with wood treating wastes.

EPA and MDHES have designed a coordinated plan emphasizing efficient investigation and cleanup of the sites. In 1988, EPA published a Clark Fork Master Plan. This summer, EPA will publish an updated and expanded Master Plan. Both the coordinated plan and the Master Plan prioritize the activities of 25 "operable units" and 77 smaller problem areas of the Clark Fork Superfund sites. The Master Plan also includes work underway by other agencies conducting studies in the basin.

Silver Bow Creek/Butte Area

Site Background

The Silver Bow Creek/Butte Area site generally includes Walkerville, Butte, the Berkeley Pit, Silver Bow Creek, Rocker, the Warm Springs Ponds and the Clark Fork River to the Milltown Reservoir, about five miles southeast of Missoula.

The Silver Bow Creek site officially became a Superfund site in 1983 when it was added to the National Priorities List of Superfund sites. Mining, milling and smelting wastes, primarily heavy metals, have contaminated thousands of acres of flood plain and streambanks as well as residential areas in Butte. The wastes are toxic to plant and aquatic life and may pose a threat to human health.

Since February 1990, EPA has assumed the lead role on all Silver Bow Creek investigations except for studies of streamside tailings which remain under MDHES lead. The main potentially responsible party, ARCO, will be given the opportunity to

conduct the actual remedial investigations and feasibility studies for all Silver Bow Creek operable units. EPA may offer the responsible parties the opportunity to conduct site investigations and cleanup. ARCO will conduct its investigations in compliance with work plans developed or approved by, and under close supervision of, EPA and MDHES.

Current Activities

Warm Springs Ponds: *The ponds were originally built by Anaconda Mining Company beginning in 1911 with the construction of Pond 1. The ponds were designed to trap and hold mining wastes flowing down Silver Bow Creek and other streams before being released into the Clark Fork. MDHES prepared a feasibility study and cleanup plan for the ponds, and held public meetings and hearings last December to present a cleanup plan to the public. MDHES is now preparing detailed responses to the numerous comments received.*

In addition, ARCO developed a somewhat different alternative for cleanup of the ponds and presented it to MDHES and the public. MDHES and EPA are reviewing the merits of ARCO's plan in detail. As a result of the public comments and ARCO's proposed plan, the final cleanup of the ponds is likely to be a combination of plans. The final cleanup approach will be uncertain until EPA completes the Record of Decision which will spell out the selected cleanup plan. Improvements to the pond berms to protect them from earthquake and flood hazards will begin this summer, with other improvements to the pond systems to begin in 1991. The proposed cleanup is expected to defer decisions about the need for an upstream flood management impoundment and the adequacy of utilizing Pond 3 for treatment of flood flows until 1995, when operating experience and other Superfund activities upstream can better define the viability of ARCO's proposed treatment approach.

Mill-Willow Bypass: *Because EPA and MDHES suspect the Mill-Willow Bypass is the major area responsible for fish kills in the upper Clark Fork, ARCO has begun to identify and isolate tailings and contaminated soils that wash into the bypass and upper Clark Fork during summer storms. A work plan for removal of these wastes is being developed now and cleanup is projected to begin in the bypass late this summer.*

Streamside Tailings: *Large amounts of tailings have been deposited on the banks of Silver Bow Creek between the Colorado Tailings in Butte and the Warm Springs Ponds. Because vegetation will not grow in these contaminated areas, they are typically bare and are susceptible to wind and water erosion. MDHES is currently investigating one alternative to revegetate these tailings to prevent erosion and movement of contaminants. In addition, a remedial investigation and feasibility study, which will begin this year and last about two years, will consider several alternatives for handling tailings deposits in the streambed including removal, rechanneling the creek, revegetation and combinations of these alternatives. The Streambank Tailings and Revegetation Study (STARS) test plots are part of this investigation.*

Clark Fork River: *Tailings have been deposited at numerous locations along the Clark Fork River between the Warm Springs Ponds and Milltown Reservoir. MDHES conducted a preliminary survey of contamination along the Clark Fork. The results of this survey will be available this summer. EPA is planning to begin the remedial investigation/feasibility study on this site in early 1991. The upper portion of the river is the site of an ARCO-funded demonstration project that will test various methods for stabilizing the tailings in place.*

Source: *Progress* newsletter, pp. 1-3. May 1990. Montana Department of Health and Environmental Sciences and the U.S. Environmental Protection Agency.

INSTREAM FLOW LEASING (HB 707)

DNRC received several comments about the possibility of DFWP leasing existing water rights to provide instream flows in the upper Clark Fork basin. House

Bill 707 authorizes such leasing as part of a study program. The purpose of HB 707 is to examine the feasibility of leasing existing water rights to maintain and enhance streamflows for fisheries. This study includes a four-year *pilot program* that allows *only* DFWP to lease water from willing right holders.

Up to five stream reaches can be designated for leasing under HB 707; to date none have been so designated. DFWP has not recommended any streams or reaches in the upper Clark Fork basin for instream flow leasing.

Leases are voluntary and must be approved by DNRC through the water right change process. A lease cannot be approved if senior water right holders show that the use of their rights would be adversely affected. Instream flow leases cannot be approved for more than 4 years, but may be renewed for up to 10 years if no adverse effects are shown. If the 1992 Legislature does not reauthorize HB 707, all leases will expire on July 1, 1993.

WILD AND SCENIC RIVERS DESIGNATION

The Wild and Scenic Rivers Act provides a means to protect river corridors in their present state. The study process for any particular river is initiated either at the direction of the U.S. Congress or through the planning process for federal agencies such as Bureau of Land Management or the U.S. Forest Service. Formal designation of a river requires congressional approval.

To be eligible for inclusion in the National Rivers System, a river segment must be free-flowing and, with its adjacent land area, must possess one or more "outstandingly remarkable" values. Three categories of protection are available under the act, depending on the degree to which the natural environment of the river has already been altered. *Wild* river areas are defined as those that are free of impoundments, inaccessible except by trail, with watershed or shorelines essentially primitive. *Scenic* rivers may have shorelines accessible in places by roads. Finally, *recreational* rivers may be readily accessible by roads, may host some development along the shoreline, and may have undergone some impoundment or diversion in the past.

Three streams in the upper Clark Fork basin are being evaluated for inclusion in the National Rivers System. The Little Blackfoot River is being studied for suitability as a wild river in one stretch and as a recreational river in another. The Little Blackfoot River is one of the Clark Fork tributaries on which DFWP is requesting an instream flow reservation. Copper Creek is being evaluated for suitability as a recreational river. Upper Rock Creek has been found to be suitable for recreational river designation. The act primarily protects federal lands and offers only limited protection of the attributes of the stream that made it eligible when these occur on private, state, or county property.

COLUMBIA RIVER SYSTEM OPERATION REVIEW

The Columbia River System Operation Review is a study of 14 large federal dams in the Columbia basin and how they may be operated to best manage the river for many competing uses. The Clark Fork is one of the headwater streams of the Columbia River and will be included in the study. The review is being conducted by the U.S. Army Corps of Engineers, the Bureau of Reclamation (USBR), and the Bonneville Power Administration (BPA).

The review will provide a basis for renegotiating two major sets of agreements on electric power supply in the basin. The Canadian Entitlement Allocation Agreements and the Pacific Northwest Coordination Agreement both expire in the year 2003. The review will ensure that the renegotiated agreements reflect the increased demands for water and the value of other uses. Renegotiations are scheduled to be completed by 1994; renewed agreements will be in place before the 2003 expiration date.

The interagency team is in the early stages of preparing an EIS describing how the river and dam system is used for irrigation, hydropower production, flood control, recreation, navigation, and fish and wildlife. The EIS will also examine how these uses interact and will provide a strategy for operating the system to better meet increasing demands. This information will help to resolve user conflicts and improve river management. The draft EIS is due out in the spring of 1992. The final EIS and a decision on system operation will be released by February 1994.

DEERLODGE FOREST MANAGEMENT PLAN

If GCD's proposed project on Boulder Creek is built, the dam abutments, some of the shoreline, and portions of the canal route would lie on lands in the Deerlodge National Forest. These lands are managed according to the goals and objectives of the Deerlodge Forest Management Plan (USFS 1987), which neither provides for nor prohibits the construction of dam projects. However, USFS permits would be needed, and the USFS may require GCD to conduct further environmental studies as part of the permitting process.

Rangelands along the proposed canal route are

currently managed for livestock forage and big game habitat. Lands around Princeton have been designated to provide special use sites for recreation. Forested lands crossed by the canal are currently managed for timber production.

NORTHWEST POWER PLANNING COUNCIL PROTECTED AREAS DESIGNATION

In 1988, the Northwest Power Planning Council designated about 2,200 miles of streams in western Montana as protected from future hydroelectric development. Streams were selected based on their high fish and wildlife values. Irrigation storage projects are not affected by the designation. Table 3-17 indicates which streams in the upper Clark Fork basin were protected. DFWP is requesting reservations on five protected streams. GCD's proposed project on the North Fork of Lower Willow Creek would be upstream of the protected reach of Lower Willow Creek, and the canal route for GCD's proposed project on Boulder Creek would cross Douglas Creek, another protected stream.

The council is reviewing these protected streams to determine their potential for future hydroelectric development. Streams or reaches with no potential for hydro development may be taken off the list of protected areas.

Table 3-17. Protected Streams and Reaches in the Upper Clark Fork Basin.[a]

Stream or reach	Purpose: Fish	Purpose: Wildlife
German Gulch	X	
Beefstraight Creek	X	
lower Mill Creek		X
upper Warm Springs Creek[b]		X
lower Lost Creek[b]		X
lower Dry Cottonwood Creek		X
lower Modesty Creek		X
Dempsey Creek[b]	X	X
upper Powell Creek	X	
lower Peterson Creek		X
Telegraph Creek	X	
Dunkleberg Creek		X
Clark Fork main stem[b] (Dunkleberg Ck. to Drummond)		X
Douglas Creek[c]	X	
Lower Willow Creek[c]	X	
Harvey Creek[b]	X	

[a]Excluding streams in the Rock Creek drainage.
[b]Streams included in DFWP's reservation requests.
[c]Streams associated with GCD's reservation requests.

OTHER STATE AND FEDERAL PERMITS

Other state and federal agencies may have jurisdiction over certain aspects of the reservations requested by GCD and DFWP. Table 3-18 lists these agencies, relevant laws, and permits that may be required.

Table 3-18. Agencies with Possible Jurisdiction.

Agency	Permit or Relevant Law
Bonneville Power Administration	Review of access and easements
USFWS	Endangered Species Act
DHES	Water and air quality permits
DNRC	Dam Safety Act and permit
Montana Department of State Lands	Hazard reduction permit, Best Management Practices notice, easements for projects on state lands
FERC	Possible subordination of hydro power licenses
GCD	Montana Natural Streambed and Land Preservation Act and Permit
State Historic Preservation Office	Cultural and historic resources survey
U.S. Army Corps of Engineers	404 water quality permit
USBR	Small project loan program
USFS	Special use permit

CHAPTER FOUR

COMMENTS AND RESPONSES

INTRODUCTION

This chapter presents DNRC's responses to public comments on the draft EIS and addendum.

The 90-day comment period on the draft EIS ended March 16, 1989. Three public meetings were held on the draft. All meetings began at 7 p.m. and were held in Drummond on January 16, in Deer Lodge on January 17, and in Bonner on January 18, 1989. Fifty-four people attended the meeting in Drummond, and 17 of them presented comments. The Deer Lodge meeting was attended by 24 people, 10 of them offering comments. Forty people attended the Bonner meeting, and 8 of them presented comments.

In general, comments at the public meetings on the draft EIS focused on DFWP's requested reservations. People at the Drummond meeting spoke against DFWP's requests, citing them as obstacles to future agricultural and industrial development in the basin. In contrast, at the Bonner meeting, people spoke in favor of DFWP's requests and voiced support for instream flows to protect fish and recreation resources in the upper basin and to benefit downstream urban and commercial water uses. Both sides of this debate were presented at the Deer Lodge meeting, and participants there discussed ways to work together to satisfy both development and instream flow demands.

DNRC received a total of 42 letters commenting on the draft EIS during the comment period. A rough breakdown of letters by source would be:

State and local government agencies	4
Industry	3
Agricultural associations	4
Conservation groups	8
Interested individuals	23

The addendum to the draft EIS was released on March 16, 1990, followed by a 45-day comment period ending May 1, 1990. One public meeting on the addendum was held in Drummond on April 4, 1990. Forty-one people attended, 17 of whom presented comments. Many of the speakers were residents or property owners from Maxville and the Boulder Creek valley, and the comments reflected their opposition to GCD's proposed dam and reservoir. Concerns were voiced about dam safety and the local geology, and about the dam's impact on property values, the fishery, scenic qualities, and domestic groundwater supplies. Several area ranchers spoke in favor of the project, citing the economic benefits of water storage and irrigation.

DNRC received 19 letters commenting on the addendum, as shown here with sources indicated:

State and local government agencies	1
Federal agencies	1
Industry	1
Agricultural associations	2
Conservation groups	3
Interested individuals	11

Comments on the addendum and the draft EIS it supplements ranged from statements of support for or opposition to the individual reservation requests to questions on technical aspects of the various resources, the impacts, and the methods used to analyze them. A number of people also pointed out errors or omissions, or requested updates and clarification of the issues. The issues that attracted the most comments include: the amount of water requested by DFWP, the impacts of the reservations on existing rights, the role of storage in providing water for agriculture and instream flows, dam safety and the impacts of storage development, dilution of water-borne metals and other pollutants, and the economic costs and benefits of granting the requested reservations.

COMMENTS AND RESPONSES

The following pages present written and oral comments and DNRC's responses to the substantive issues raised in them. Copies of all written comments have been reprinted, along with transcripts of oral comments, on the left-hand side of the page and are numbered 1 to 490. Responses, numbered to correspond to comments, appear on the right-hand side of each page.

Comments 1 through 324 include all of the written comments received on the draft EIS, and numbers 325 through 373 are oral comments on the draft collected from public meetings. Numbers 374 through 473 include all of the written comments received on the addendum, and 474 through 490 are oral comments received at the public meeting in Drummond in April 1990.

Comments 1 through 324 include all of the written comments on the draft EIS received by DNRC.

320 Lost Horse Rd.
Hamilton, MT 59840

January 12, 1989

Montana Department of Natural Resources and Conservation
1520 East Sixth Avenue
Helena, MT 59620

SUBJECT: CLARK FORK RIVER INSTREAM FLOW REQUEST

Since I shall not be able to attend any of the proposed hearings on this subject, I am writing to give my absolute support to the Department of Fish, Wildlife and Parks request for an instream
1 flow reservation for the Clark Fork. This is a minimum step to insure our economic and environmentally viable future in this watershed for which we all must work and DFWP is to be commended for moving to make this request for our long term good in spite of the inevitable short sighted objectors.

Sincerely,

Laura Mae Jackson

RECEIVED
JAN 16 198.
MONT. DEPT. of NATURAL RESOURCES & CONSERVATION

1. Your recommendation is noted. By its inclusion in this final EIS, your recommendation will be part of the legal record presented to the Board.

SKYLINE SPORTSMEN'S ASSOCIATION, INC.

P. O. BOX 173 BUTTE, MONTANA 59701

Members of the Committee.

I am Bill Holdorf President of Skyline Sportsmen's Assoc. in Butte Skyline is a member of the Clark Fork Coalition.

2 We support option #I of the E. I. S.

3 We ~~also~~ also support in-stream flows for the protection of fish + wildlife.

4 Recreation is a large part of the economy of Mont. Without in-stream flow of water it will lose a large portion of this money.

Bill Holdorf
President - Skyline

2-3. Your recommendations are noted. By their inclusion in this final EIS, your recommendations will be part of the legal record presented to the Board.

4. The recreation industry is an expanding element of Montana's economy, but the upper Clark Fork main stem and tributaries receive less commercial recreation use than many other western Montana rivers. See the response to comment 7.

Any major reductions in stream flows that would adversely affect recreational activities in the upper basin are also likely to adversely affect businesses serving the recreationists. Significantly reduced flows might inhibit the future development of the recreation industry in the upper basin.

1/13/89

Subject: Clark Fork Instream Flow Request

I am writing for the hearing record to offer my strong support to the Department of Fish, Wildlife, and Parks request for an instream flow reservation for the Clark Fork.

The reservation will be in the long term interest of Montana economically and environmentally. I ask that the request for the flow reservation be granted.

5

Thankyou

Sincerely,

Robert Oset
320 Lost Horse
Hamilton, MT
59840

5. Your recommendation is noted. By its inclusion in this final EIS, your recommendation will be part of the legal record presented to the Board. For discussions of the long-term effects of granting DFWP's requests, see the responses to comments 160, 253, and 264.

EDUCATION · CONSERVATION

Montana Wildlife Federation

AFFILIATE OF NATIONAL WILDLIFE FEDERATION

Tony Schoonen
Ramsay, Montana 59748
406-782-1560

Members of The Committee:

For the record my name is Tony Schoonen President of The Montana Wildlife Federation. Our group is a member of the Clark Fork Coalition.

6 We would like to go on record in support of option I of The EIS.

7 we would like to emphasis the importance of in-stream flows – helps the economy of local communities by providing recreational opportunities & enhances local land uses.

8 Instream flows also helps clean up the river which has been polluted by past mining practices etc.

9 Instream flows do not take away water rights of any permit holder, instead merely reserve flows not reserved or granted as water right.

These flows will benifit every one.

Thank you.

THE WEALTH OF THE NATION IS IN ITS NATURAL RESOURCES

6. Your recommendation is noted. By its inclusion in this final EIS, your recommendation will be part of the legal record presented to the Board.

7. Expenditures made by recreationists do benefit local businesses and their employees. To the extent that an instream flow reservation would help to maintain opportunities for recreation activities in the upper basin, it would benefit businesses catering to recreationists. See also the response to comment 4.

   An instream flow reservation could benefit residential and commercial land uses by preserving aesthetic qualities along the Clark Fork main stem and its tributaries.

8. DFWP's instream flow reservations alone will not help clean up the river because they neither reduce toxic materials entering the river nor make additional water available for dilution. DFWP's reservations would help maintain existing conditions by limiting further depletions of dilution flows. For more information on mining-related wastes in the Clark Fork and how DFWP's requested reservations would interact with the ongoing Superfund cleanup, see the responses to comments 49, 53-56, 63, 64, and 78 and the discussion of Superfund activities in Chapter Three of this final EIS.

9. As with other water rights, an instream flow reservation cannot be granted if the record of the contested case hearing shows that the use of senior water rights would be adversely affected. See the responses to comments 42 and 203 for further discussion.

January 18, 1989

Bill Burnett
1520 Garfield
Missoula, Montana 59801

DNRC
1420 East Sixth Avenue
Helena, Montana 59620

To Whom it May Concern,

I want to speak in favor of preserving the instream flows
10 specified by the Montana Department of Fish, Wildlife and Parks.

These waters ought, it seems to me, to be set aside for the reasons and kinds of reasons suggested by the DFWP, but for another perhaps more basic and essential reason as well.

The essential need in this effort is to preserve, as best we still can, the ecology of the Clark Fork River Basin. I would suggest that an ecology, as a complex of living organisms and
11 associated physical structures, is in and of itself something like a resource, but more important and more fundamental than any particular resource. An ecology is the context itself, the sustaining physical presence of the resources and opportunities we encounter in the world around us.

The management decisions associated with the DFWP request are critical to efforts to preserve this Basin. An assertion that we manage a multiplicity of resources together, and that here
12 tonight we discuss <u>that</u> element of management, fails to recognize the sorts of relationships involved in river basin ecologies. Such an assertion tends to fragment the possibility of the survival of elemental relationships inherent in the life of the river. Preservation of habitat is a beginning of successful management.

I think that we must suggest, discuss, and discover the basic presumptions underlying not just our efforts for conservation of resources, but the economics and politics of our
13 natural resource related decisions as well. These instream flows are essential to the river as an ecology, and to the premise that we conserve our resources for the future use, enjoyment, and I would add, survival, of our children.

I urge the preservation of these instream flows and
14 further,the establishment of associated instruments which would tend to supplement and reinforce the value of such preservation.

Thank you for your consideration.

Bill Burnett

Bill Burnett

10-14. Comments noted.

RECEIVED

JAN 21 1989

MONT. DEPT. of NATURAL
RESOURCES & CONSERVATION

Ron Pierce
603 Stewart Street
Opportunity, MT 59711
1/19/89

John Tubbs
DNRC, Water Resource Div.
1520 East 6th Ave.
Helena, MT 59620-2301

RE: Clark Fork Reservations

Dear Mr. Tubbs;

Please accept these comments concerning the Clark Fork Instream Flow Reservations.

I grew up in the Deer Lodge valley at the confluence of its headwaters. It has always
15 been my hope that the decades of watershed abuse and river degredation would reverse. The process is reversing. Lets keep it going.

I believe maintaining minimum flows at
16 requested levels for all 18 streams is appropriate for several reasons. They include the fishery value, wildlife considerations, recreation and the dilution of pollutants.

I spend alot of time hunting and fishing
17 along the tributaries and the mainstem, and I believe with these reservations, it has tremendous potential.

Sincerely,
Ronald W. Pierce

15-17. Your comments and recommendations are noted. By their inclusion in this final EIS, your comments will be part of the legal record presented to the Board.

FIVE VALLEYS AUDUBON SOCIETY
P.O. BOX 8425, MISSOULA, MT 59807

DNRC
1520 East 6th Ave.
Helena, MT 59620

To whomever this may concern:

The members of Five Valleys Audubon, located in Missoula, supports the measure proposed by Fish, Wildlife and Parks for reservations of instream flows in the upper Clark Fork River and 17 tributaries. Audubon members are active outdoorspeople and birders. We feel that
18 to preserve the habitats necessary to sustain our lives and those of wildlife, the basic natural resources of the habitats must be protected and enhanced. The request by Fish, Wildlife and Parks is directly aimed at protecting not only the instream flows of the river but the entire surrounding ecosystems that the river sustains.

In reviewing the EIS, Five Valleys Audubon does not support the alternative which is to subordinate future offstream uses
19 after granting instream reservations. In other words, we do not support taking away reservations once they have been granted. However, we are not opposed to the Granite County request for a dam on the North Fork of Willow Creek.

In general, Five Valleys Audubon supports the continuing studies and
20 work accomplished by The Clark Fork Coalition, of Missoula and in particular we support the request made by Fish, Wildlife and Parks.

Thank you so much for your time.

Sincerely,

Linda Helding
Conservation Chair

Bill Ballard
President

18-20. Your recommendation is noted. By its inclusion in this final EIS, your recommendation will be part of the legal record presented to the Board. Although maintaining instream flows at existing levels would benefit the riparian ecosystem, other factors beyond the scope of the reservations, such as recreational use intensity and pollution discharge practices, also influence the vitality of the ecosystem.

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JAN 27 1989

MONT. DEPT. of NATURAL RESOURCES & CONSERVATION

1/24/89

John W. Craig
Senior Vice President

Montana Dept. of Natural Resources & Conservation
1520 E 6th Ave
Helena, MT 59620

Dear Friends —

As a regular summer visitor to your great state, my family & I have enjoyed the generally improved fishing in the Clark Fork near Missoula. We understand that Fish, Wildlife & Parks share our concern that reduced flows in the Clark Fork & Tributaries can have a deleterious effect on a resource near & dear to the hearts of all of us who love Montana

21 We urge careful consideration of any permits for water diversion that can contribute to damaging that habitat in what we feel has a real chance of becoming one of America's premier fishing streams — the Clark Fork.

Respectfully,

FRED. S. JAMES & CO., INC. 505 Sansome Street, San Francisco, California 94111 415 983-9605

21. Your comments and recommendation are noted. By their inclusion in this final EIS, your recommendations will be part of the legal record presented to the Board.

american fisheries society
MONTANA CHAPTER

January 24, 1989

RECEIVED
JAN 27 1989
MONT. DEPT. of NATURAL RESOURCES & CONSERVATION

Mr. John Tubbs
re: Clark Fork Reservations
Dept. of Natural Resources & Conservation
Water Resources Division
1520 E. 6th Ave.
Helena, MT 59620

Dear Mr. Tubbs:

The Montana Chapter, American Fisheries Society (MCAFS) has reviewed the draft EIS on the Clark Fork Reservations and would like you to consider the following comments.

The DNRC's preliminary recommendations on page 94 state that the Department of Fish, Wildlife and Parks has shown a need for the reservations and that they are in the public interest. MCAFS
22 agrees with this conclusion. The Clark Fork River basin currently suffers from severe dewatering, particularly in the basin above the Little Blackfoot River. There is a need to receive legal protection for instream flows to prevent even greater problems in the future. MCAFS believes the final EIS should recommend the
23 highest instream flow levels possible, consistent with the availability of unappropriated water in the basin.

We agree that water availability is a key factor the Board must consider in reaching its decision. However, we believe the existing dewatered condition of the Clark Fork requires a maximum amount of water be allocated for instream flows. Consumptive uses already receive more than a fair share of the water resources in
24 the basin. Fishing and recreation are becoming more and more of an economic factor in our society. We believe that successful reclamation of mine wastes in the upper basin combined with procurement of adequate instream flows will provide a greatly improved fishery in the Clark Fork River. However, reclamation will have little value if stream flows are inadequate to enable such an improvement to occur.

MCAFS disagrees with your proposal to subordinate instream flows to future consumptive uses. We believe instream flows, once given a priority date, should not be subject to future uses. The subordination concept is not consistent with the "first in time, first in right" principle, and diminishes the value of instream
25 flow. Existing statutes already require a 10-year review of flow reservations to determine whether intended objectives are being met and the Board of Natural Resources has the option of reallocating reserved instream flows every five years. Although we are uncomfortable with the insecurity provided to flow reservations by existing laws, this process is more reasonable than subordinating reservations from the beginning.

22-25. Comment noted. The reservations would not add water to the streams nor alleviate existing low-flow conditions, but could limit new uses and thus help maintain existing flow conditions. See also the response to comment 203.

We agree with your analysis and some of your preliminary recommendations concerning the GCD application. However, the statement (page 94 column 1, last paragraph) that "...DFWP's instream flow request would essentially preclude future offstream use of most water currently available for appropriation except in high spring flows", is misleading. The statement on page 59 indicates that there is little conflict between GCD's application and FWP's requests except in March and April. DFWP has not made application on Lower Willow Creek. Clearly, the DFWP request does not preclude future offstream use on Lower Willow Creek.

26

As we stated earlier, we are opposed to subordination of any instream flows that are granted. However, if the Board should deny the GCD reservation but subordinate instream flows to future use of that water, we believe subordination should be limited only to Lower Willow Creek and not to other potential projects in the basin. There is apparently little interest in consumptive water reservations in the upper Clark Fork. No other public entities except GCD made application for reservations. About 100,000 acres are presently under irrigation in the basin and these projects already seriously deplete flows in the main river and its tributaries. There is very little land suitable for new development in the upper basin according to the EIS. We believe therefore, that instream flows are the most appropriate use of the remaining available water.

27

We commend DNRC for a good job, overall, in preparation of this DEIS. We hope our comments will be considered in the preparation of the final EIS.

28

Sincerely,

Chris Hunter,
Secretary/Treasurer

26. DFWP's request for all of the instantaneous base flow in Flint Creek from January 1 through April 30 would conflict in March and April with GCD's request to store flows on the North Fork of Lower Willow Creek, which is a tributary of Flint Creek. This conflict would be minor because GCD would primarily store high spring flows, which are not requested by DFWP. See also the response to comment 57.

27. Comment noted. Although water development has slowed recently (see the responses to comments 85 and 341), an estimated 8,362 acres of undeveloped irrigable land exist in the Clark Fork basin above Milltown Dam (see page 22 of the draft EIS). In the future, other consumptive uses, such as mining and industry, may seek water for development. Irrigators and other water users in the upper basin are also concerned about the instream reservation and the effect it might have on their ability to change their existing rights or to appropriate water for new uses.

28. Comment noted.

RECEIVED

FEB 03 1989

MONT. DEPT. of NATURAL RESOURCES & CONSERVATION

4741 Sundown Rd.
Missoula, MT 59801

Jan. 31, 1989.

Department of Natural Resources and Conservation
1520 East 6th Ave.
Helena, MT 59620

Dear Sirs,

The Clark Fork River is an extremely important feature of western Montana. You are well aware of its importance for wildlife, as a fishery and for recreation. The fishery could be enhanced. We are ever more cognizant of the economic value of recreation. The every day work the river does for us in diluting and carrying away the treated products of the Missoula sewage plant and of the kraft paper mill is of enormous value. 29

All the values are threatened by the toxic waste that remains in the river and floodplain as a result of former bad mining practices. All of the river values are threatened by low water. It is particularly important that the instream flow reservations proposed by the Dept. of Fish, Wildlife and Parks be approved in both main stem and tributaries. 30

It has been pointed out that after this reservation there will not be river water available for future additional irrigation or industry. There is no question that maintaining and protecting instream flow is of greater importance. Any new water users would have to purchase rights from current users. 31

We strongly oppose any clause in the statement of this right which could allow it to be changed or removed in the future. The water must be retained in the river for needs of the wildlife and the fishery, for aesthetic values, for recreation and for dilution of permitted effluents previously mentioned. 32

Sincerely,

Alice H. Austin

Alice H. Austin

Briggs M. Austin

Briggs M. Austin

29-30. Your comments and recommendations are noted. By their inclusion in this final EIS, your recommendations will be part of the legal record presented to the Board. See also the responses to comments 4, 8, 89, and 253.

31. Future irrigation and industrial development could still occur even if DFWP is granted its reservations. Water rights could be bought by any user that could afford the market price and then changed to the new use. Such changes are subject to approval through existing administrative procedures. In some cases, supplemental irrigation would still be possible, and full-service irrigation could be developed if viable storage projects are identified. Industrial water users also could build storage or purchase and change existing water rights. The responses to comments 26 and 57 discuss future development and DFWP's reservations requests. See the response to comment 33 for a discussion of storage.

32. Comment noted. Even if DFWP's reservations are not subordinated to other future uses, Montana water law allows instream reservations to be revoked or reallocated after a hearing by the Board (§ 85-2-316(10) and (11), MCA). An instream reservation can be reallocated only to another qualified reservant.

DEPARTMENT OF NATURAL RESOURCES
AND CONSERVATION

STAN STEPHENS, GOVERNOR

1520 EAST SIXTH AVENUE

STATE OF MONTANA

DIRECTOR'S OFFICE (406) 444-6699
TELEFAX NUMBER (406) 444-6721

HELENA, MONTANA 59620-2301

January 31, 1989

MEMORANDUM

TO: Dave Darby, Acting Director

FROM: Resource Conservation Advisory Council

Sever Enkerud
Robert Lane
Dale Marxer
Shirley Parrott
John Teigen, Jr.
Ole Ueland
John Vanisko

SUBJECT: Comments on the Upper Clark Fork Basin Water Reservation Draft EIS

At their January 9, 1989 meeting, Resource Conservation Advisory Council unanimously pass a motion to submit the following comments on the draft Environmental Impact Statement of the Upper Clark Fork Basin Water Reservation Application.

1. The DEIS should address the alternative for the Department of Fish, Wildlife and Parks to gain water rights for instream flows by investing in and building storage projects to meet their needs or, preferably, by cooperating with other water beneficiaries (users) in the building of multi-purpose storage projects since there is inadequate water for current water rights. 33

2. The DEIS should address the Granite Conservation District (GCD) proposed storage project contribution to other beneficial uses since only a small percentage of the stored water is actually consumed in the irrigation process and the return flows are available for other uses. 34

3. Many of the statements made in the DEIS are questionable:

   a) The DEIS implies that the GCD storage project does not favorably impact downstream uses, such as less power generated. On the contrary, the Federal Water Power Act recognizes that upstream storage contributes to downstream power projects. In fact, Montana Power pays and receives payment where these situations occur. 35

CENTRALIZED SERVICES DIVISION (406) 444-6700 | CONSERVATION DISTRICTS DIVISION (406) 444-6667 | ENERGY DIVISION (406) 444-6697 | OIL AND GAS DIVISION (406) 444-6675 | WATER RESOURCES DIVISION (406) 444-6601

33. As with any other reservation application, DNRC examines alternatives that would serve the applicant's stated purpose and be more cost-effective than the proposed project. In this case, a reservation is the most cost-effective way DFWP can protect instream values. No dams were proposed by DFWP. The costs of building and operating any one dam would likely exceed the cost of obtaining and administering reservations on all 18 streams. Even if DFWP built storage, the agency would still need a water right, which would entail administrative and enforcement costs similar to those associated with a reservation. In this case, storage does not appear to be a feasible option.

DFWP has cooperated with other water users in building and maintaining storage projects. The agency also operates a number of storage projects across the state to benefit fish, wildlife, and recreation. Granting DFWP's reservation requests might not preclude new storage development in the upper basin, particularly if it would benefit fish and wildlife. But other methods of securing instream flows, such as reservations and leasing, are often more expedient, less expensive, and less disruptive to the environment. Finally, because DFWP's requested use in the upper Clark Fork basin is nonconsumptive, the agency does not need to store high spring flows to provide a supply of water.

The scope of this EIS does not allow a more complete discussion of the storage issue. The role of storage development in managing Montana's water resources is being addressed during the current cycle of the State Water Plan.

34. Return flows from irrigation were considered when evaluating the beneficial and adverse effects of GCD's proposal (see pages 115 and 116 of the draft EIS). In both DNRC's and GCD's hydrologic analysis, return flows were estimated to be 2.36 af per acre, or 61 percent of the total diversion requirement for full-service irrigation. See the responses to comments 348 and 277 for discussions of the benefits and costs of reusing this water downstream.

35. The Federal Power Act, 16 U.S.C. No. 803(f), provides that headwaters benefits be paid by a licensee (downstream hydropower producer) if it is directly benefitted by the construction of a storage reservoir or other headwater improvement of another licensee, a permittee, or of the United States. GCD has not proposed any hydroelectric development and will not meet the above criteria; therefore, downstream hydropower producers will not be required under federal law to pay headwaters benefits.

DNRC has revised its estimates of the effects of GCD's proposed projects on downstream hydropower generation. See Chapter Three in this final EIS for the revised estimates and further discussion.

b) The exorbitant cost of building the GCD project quoted as opposed to the figures of the GCD. The DEIS states
36 considerably higher costs for constructing the GCD than current estimates.

c) others - although much good information is presented.

4. The DEIS should address long-term economic and social benefits including society's need for greater food and fiber production, the increased value of these products in the future, as well as the overall affected contributions to Montana's economy and communities;
37 the effects of inflation; the added value and ability for each beneficial use to pay; the need for new formulas to determine ability to pay; the alternative of private enterprise (farmers, ranchers, others) to capitalize on water use or transfer of their water rights to instream use benefits and receive income therefrom.

36. The cost estimates made by DNRC are based on recent bids for dam construction in Montana and USBR cost curves. USBR cost curves were used because they are based on actual construction costs; are well documented and case specific to embankment dam construction; and they reflect the degree of planning, design, quality assurance, and field inspection required for the size and type of dam proposed by GCD. In applying the USBR cost curves, DNRC spot checked them against costs of similar projects and found them to be reasonable. Based on these data, GCD's cost estimates are too low. For a discussion of how DNRC's cost estimates were derived, see Appendix E of the draft EIS.

37(a). GCD's proposed project would increase production of alfalfa hay and small grains. After adjusting for inflation, the long-term historical trend of prices for both of these commodities is downward. DNRC used the best available information to forecast future prices. DNRC used 300 different price scenarios to examine the economic and financial feasibility of this project because future prices cannot be known with certainty. Some of the 300 scenarios have an increasing price trend, but most do not. Prices for these commodities could be higher in the future, but this is unlikely.

Granite County agricultural producers compete in a global market. Most of the farmers they compete with have lower input costs and almost all have longer growing seasons. World food production has kept pace with population growth for the last two decades. Widespread hunger in the world today is primarily the result of war or other social disruption and the fact that many people cannot afford an adequate diet.

37(b). If the project returns a profit, it will directly benefit the 20 ranches that participate, and this will indirectly stimulate the local economy. If it is built and operates at a loss, it will financially hurt, and might bankrupt, the participants with a resulting indirect detriment to the local economy.

Agriculture remains an essential contributor to Granite County's economic base; however, agriculture's ability to support the local economy has decreased over time. From 1969 to 1987, people employed in county agriculture decreased from 243 to 229 (U.S. Department of Commerce 1989a). In 1987, 25 percent of county farm proprietors earned the majority of their incomes from other occupations (U.S. Department of Commerce 1989a). Inflation-adjusted farm income in the 1980s was significantly lower than in previous decades. Increases in agricultural productivity have not arrested the trend for decreasing employment income and local purchases by the agricul-

38 The Resource Conservation Advisory Council recommends that Department of Fish, Wildlife and Parks' application be denied as presented or modified to include storage as a means of providing their instream needs.

39 The Resource Conservation Advisory Council recommends that benefits other than irrigation benefits be included in the GCD request and their application be modified to reflect such.

tural sector. Therefore, increased agricultural productivity is likely to have only slight effects on the overall performance of the local economy. If economic growth occurs in the upper Clark Fork basin, it will more than likely stem from sectors other than agriculture (Boyer 1990).

37(c). DNRC's analyses of the benefits and costs of GCD's and DFWP's proposed reservations were performed holding the general price level constant at its 1988 value. The effects of future inflation were removed from benefits and costs, and the discount rate used to find the present value of future benefits and costs was adjusted for inflation. Including projected inflation in both future prices and the discount rate would give the same results.

37(d). DNRC examined both the financial feasibility of the project and the total benefits and costs of the project, for both GCD and other parties. In the past, federally subsidized irrigation projects have based their charges to irrigators on ability-to-pay formulas. The direct cost to taxpayers of the federal subsidy equals the benefit to irrigators of only paying part of the project costs. Subsidizing an irrigation project therefore has no effect on the net benefits of the project, unless the administrative costs of the subsidy program and the economic efficiency losses from the increased tax or government debt are measurable. If GCD's project were subsidized, the likelihood that it would be financially feasible would be increased. DNRC did examine the likelihood of GCD receiving subsidies (see pages 57, 77, and 78 in the draft EIS). The desirability of changing the federal government's rules for subsidizing irrigation projects is beyond the scope of this EIS.

37(e). Altering Montana water law to allow any water right for an off-stream use to be changed to an instream use would provide a mechanism for increasing instream flows in heavily appropriated streams across the state. However, this would require action by the legislature. The suggested alternative is not a possible Board action and was not considered in the EIS. See Chapter Three of this final EIS for a description of the pilot program for leasing water in Montana.

38. Your recommendation is noted. By its inclusion in this final EIS, your recommendation will be part of the legal record presented to the Board.

39. DNRC did examine benefits and costs of GCD's proposal besides the direct irrigation benefits and costs (see pages 56-64 of the draft EIS). Any changes to GCD's application would have to have been made by GCD, not by DNRC.

Forest Products
P.O. Box 5236
Missoula, Montana 59806
406 258-5511

Champion
Champion International Corporation

RECEIVED
FEB 07 1989
MONT. DEPT. of NATURAL RESOURCES & CONSERVATION

Mr. John Tubbs
Water Resources Division
Department of Natural Resources
and Conservation
1520 East 6th Avenue
Helena, MT 59620-2301

February 3, 1989

Dear Mr. Tubbs:

Re: Clark Fork Reservations

Champion personnel have reviewed both the draft EIS for the Upper Clark Fork Basin water reservation applications and the application for reservations of water in the upper Clark Fork River Basis.

40 Based on this review, we wish to go on record for the granting of the Granite Conservation District's requested reservation in the North Fork of Lower Willow Creek and opposed to the granting of in-stream flow reservations to the Department of Fish, Wildlife and Parks (DFWP).

Our major reasons for opposing the DFWP's reservations are as follows:

1. We believe the job of regulation of present and future in-stream flow levels should fall to the Department of Natural Resources and Conservation because of its statutory authority and not interject another state agency into the water use conflict among existing water rights holders. 41

2. Granting this reservation and granting the specific flow points requested will allow the DFWP to put public and political pressure on holders of pre-existing water rights and initiate legal process against junior water right holders at the Department's discretion. 42

3. The Department's request will either preclude and/or make economically infeasible future agricultural or industrial water uses in the Basin. Especially hard hit will be the agricultural operations due to the fact that the low summer water flows coincide with the maximum use period. This conflict has been heightened unnecessarily by opposition to off-stream storage by many segments of the environmental community. 43

4. The data presented in the EIS as to the amount of water available clearly shows that granting the DFWP's request has a very high probability of causing significant problems (see pages 75-76 of the EIS). 44

We appreciate the opportunity to comment on this water rights reservation and EIS. Please make these comments available to all members of the Board of Natural Resources and Conservation.

Sincerely,

Andy Lukes
Clark Fork District Land Manager

kjg-CF-DIST\CFRESERV.let

xc: Bob Lamley
Blaine Bloomgren

40. Your recommendation is noted. By its inclusion in this final EIS, your recommendation will be part of the legal record presented to the Board.

41. The various duties and responsibilities of the state agencies are defined by the legislature. DFWP has applied for instream flow reservations because it is the agency charged to protect the state's fish and wildlife resources.

42. DFWP's reservations would be junior to all existing water rights. Under Montana law, DFWP's requested reservations cannot be granted if the record of the contested case hearing shows that the use of senior water rights would be adversely affected. See also the responses to comments 203 and 442.

43. If existing water rights do not constrain future development, then DFWP's requested reservations would prevent the appropriation of additional water for full-service irrigation and some other consumptive uses. However, if a future appropriator can afford to build storage for high spring flows or purchase existing water rights, such development would not be prevented. Nonconsumptive uses such as hydropower might not conflict with DFWP's instream flow reservations and could be developed.

Furthermore, DFWP's requested reservations would present little additional constraint to agricultural or industrial development in the upper basin if existing water right holders object to new appropriations and these objections are upheld (see pages 49 and 50 in the draft EIS).

44. The discussion on pages 75 and 76 of the draft EIS provides a clear summary of the "problems" or costs imposed by granting DFWP's requested reservations. DNRC used the term costs and benefits to present both sides of the issue.

The primary cost is that the reservations could limit future consumptive or off-stream development. See the responses to comments 31 and 43. In deciding whether to grant the reservations, the Board must weigh any costs against the benefits of protecting aquatic habitat, the recreational resource, and water quality.

RECEIVED
FEB 07 1989
MONT. DEPT. of NATURAL RESOURCES & CONSERVATION

John Tubbs
DNRC
1520 East 6th
Helena, MT 59601-2301

RE: CLARK FORK RESERVATION-DEIS

Dear Mr. Tubbs,

Enclosed are comments concerning your DEIS.

Since the Yellowstone River Basin has had reservations for over 10 years, it would be logical to look at the impacts
45 those reservations have caused. Why has this not been done? If this was done a comparison could be made between the two.

All in all, the DEIS did not contain enough accurate nor essential information to allow the Board to decide anything.

Sincerely,

A concerned Montanan
Tony Marshall

45. A look at the water reservations in the Yellowstone River basin provides some insight to the effect reservations could have in the Clark Fork, although the basins are very different. In the Yellowstone basin the Board granted water reservations for municipal (60,913 af), multiple purpose (1,111,800 af), irrigation (655,324 af), and instream flow (5,400,000 af) uses (DNRC 1982). All reservations have a priority date of December 15, 1978. However, the Board established priorities for use among these four uses. Municipal use has first priority. Upstream from the mouth of the Bighorn River, instream use has second priority and irrigation third. Below the confluence of the Bighorn River to the North Dakota border, agriculture has second priority and instream flow is third. Storage reservations have the lowest priority.

In the Yellowstone River basin, 14 conservation districts received water reservations. By August 1990, 90 irrigation projects had been developed. These projects require 26,573 af or approximately 5 percent of the total amount of water granted to conservation districts. Conservation districts are currently administering these rights.

DFWP was granted reservations on 16 streams in the Yellowstone River basin. DFWP has participated in the water rights objection process to protect these instream reservations. Now, a condition is placed on each junior permit when it is issued to inform the holders that, under certain flow conditions, the instream flow reservations may affect water availability for their projects. No permits have been denied in the Yellowstone basin because of DFWP's instream rights.

Once a junior water user has been issued a use permit, DFWP adds his or her name to a mailing list. In the spring, DFWP analyzes the likelihood of low stream flows in the upcoming summer. If, as was the case in 1988, snowpack conditions suggest that there will be low flows in the summer, DFWP issues the first of two letters to all junior water users. The letter informs the user that DFWP expects low summer flows and that the agency may request junior water users to stop diverting water. DFWP then monitors stream flows through summer. If flows drop below DFWP's instream flow right, a second letter is issued. The second letter informs the junior users that flows have dropped below instream rights and requests them to cease diverting. The letter also provides a phone number for current flow conditions so that if water levels rise, users may resume diverting.

For a response to the general complaint concerning the draft EIS's accuracy, see comment 212. Responses to the line-by-line comments made by Mr. Marshall are presented below (comments 46-115).

	Page	Paragraph	Comment
46	i	(Last)	Only asking for supplemental water to irrigate existing 2,900 acres, although these benefits (land prod. & income) seem small, they would be significant in a sparsely populated area. Define significant.
47	ii	(2nd)	"Project was not found to be feasible regardless of the dam costs used." I don't agree. The project may be technically & environmentally feasible - but is not economically feasible.
	ii	(4th)	Define: to an extent.
48	2 & 8	(8th) (4th)	"No additional analysis of impacts... is foreseen." How about future clean-up activities of mine wastes, especially in Silver Bow Creek. How about further improvements to sanitary waste discharges.
49			If both of these activities were undertaken maybe no reservation would be needed. Why haven't these alternatives been analyzed?

46. The $9.9 million project on the North Fork of Lower Willow Creek is not expected to have significant impacts on the overall social and economic characteristics of Granite County. The project on the North Fork of Lower Willow Creek is predicted to cause much less than a 1 percent increase in the county income levels and tax bases and no significant long-term increases in the county's population or its employment levels. If it returns a profit, the project would significantly benefit about 20 ranch families in a county of 2,700 people.

47. The sentence should read: DNRC performed a thorough analysis and the project was found to be economically infeasible whether GCD's or DNRC's cost estimates were used.

48. The extent to which fish, wildlife, and recreational resources would be protected is described on pages 66 through 68 of the draft EIS.

Because DFWP's request would help to maintain streamflows as they are now, there would be no additional, unforeseeable impacts for DNRC to analyze once the reservations are in use. See the response to comment 49 for a discussion of how the Superfund cleanup (or improvements in waste discharges) would affect DFWP's reservations.

49. See the response to comment 290. The reservations would maintain flows to help protect aquatic habitat at existing levels. This habitat could be enhanced if cleanup activities are successful or if waste discharges are reduced, and flows would still need to be protected to provide sufficient habitat. Thus, a cleanup alternative would not alleviate the need for an instream flow reservation and therefore was not analyzed. See Chapter Three in this final EIS for a description of Superfund activities in the upper Clark Fork basin.

50

If this was done an impact would not be unnecessarily created. Such as legal battles for future water rights. What return flows do the existing treatment plants add to stream flow?

51

50. If DFWP is granted its requested reservations, the effect on legal water availability would be as described on pages 49-56 of the draft EIS. DFWP would gain standing to object to new appropriations or changes in existing rights on reaches with instream reservations. Applicants might encounter DFWP as one more objector in the basin, but DFWP's objections would be subject to the usual hearings process under Montana water law. To have an objection upheld, DFWP would have to show that its use of the instream flow would be adversely affected by a new use or change. See also the response to comment 442.

If DFWP's participation increases the number or frequency of objections to requests for new or changed water rights, existing right holders could be affected in one of two ways. First, existing users seeking a new or changed water right might encounter DFWP as an additional objector at the hearings. This could add some time and expense to the hearings process. Second, as long as DFWP's objections are upheld, holders of pre-existing water rights may be less vigilant in asserting their own rights and might save time and money. This is not to imply that existing water right holders should depend on DFWP to protect their rights. For a look at how DFWP has administered its water reservations in the Yellowstone River basin, see the responses to comments 45 and 269.

51. Return flows from treatment plants do not "add" any new water to the stream. Return flows simply replace water that was temporarily diverted from the streams. One exception is the Butte wastewater treatment plant, where water is diverted from the Bighole River and enters Silver Bow Creek as treated effluent. Return flows generally re-enter the stream gradually, as explained in response to comment 195.

52 How about any additional upstream storage (enlargements) to existing dams? There are several that could be enlarged.

52. A thorough analysis of the feasibility of adding storage capacity to existing reservoirs is beyond the scope of this EIS. However, it may be instructive to review the status of the existing reservoirs in the upper basin.

There are five large reservoirs in the upper Clark Fork basin. These are: East Fork of Rock Creek Reservoir (16,000 af), Lower Willow Creek Reservoir (4,651 af), Georgetown Lake (31,040 af), Silver Lake (5,114 af), and Rock Creek Reservoir (4,200 af). DNRC has received no notice that any owners of these projects plan to add storage capacity.

The East Fork of Rock Creek Reservoir lies on National Forest land near the headwaters of Rock Creek, about 18 miles southwest of Philipsburg. The reservoir is capable of storing approximately 16,000 af and serves the Flint Creek Water Users' Association (DNRC 1977). The project is owned by DNRC and there are no current plans to expand the reservoir capacity. Based on DNRC storage records for the past 30 years, physical water availability may be limiting. The reservoir has not filled in 9 out of the 30 years of record.

The Lower Willow Creek reservoir, south of Drummond, is owned by the Lower Willow Creek Water Users' Association. The reservoir is capable of storing approximately 4,650 af and serves 2,900 irrigated acres. When preparing its water reservation application, GCD considered expanding the existing reservoir. GCD's analysis showed that, due to physical constraints at the existing reservoir site, it would be more feasible to construct a new reservoir on the North Fork of the Lower Willow Creek.

Georgetown Lake is in both Deer Lodge and Granite counties, about 18 miles west of Anaconda. The estimated capacity of the reservoir is 31,040 af. The stored water is used for power generation, industrial uses, irrigation, stock water, and domestic uses. There are no current plans to expand the reservoir, which is regulated by MPC. The dam was enlarged in 1919 to "impound floodwaters in Georgetown Lake that were usually lost over the spillway" (MPC 1987). MPC's Draft Application to Surrender License (MPC 1987) states that if the project is sold or transferred to another party, "the reservoir will be regulated as it currently is." The major constraint to reservoir expansion would be the cost of relocating private developments and Highway 1, which lie along the edge of the lake.

Paragraph 4 on page 8 seems to indicate (because it refers to table 2-1) that the industrial wastes are located on the main stem. But the metal concentrations, found elsewhere in the report, indicates the problem to be from Silver Bow Creek. Can you identify the location of the problem industrial waste areas?

53

On page 27, 2nd paragraph. It is not known why the ponds are less effective in the winter. Why hasn't anyone found out? This should be done before a reservation is granted. Maybe a simple solution to an unneeded reservation.

54

(response 52, continued)
Silver Lake lies in Deer Lodge County near Georgetown Lake. Water from Twin Lakes Creek and Storm Lake Creek is diverted and collected in Silver Lake, and the excess water is allowed to flow into Georgetown Lake. The facility is owned by Montana Resources, Incorporated (MRI) and has been used to deliver water for industrial uses in Anaconda and Butte and for irrigation in Deer Lodge County. Silver Lake has a useable capacity of 5,114 af, and there are no plans for expanding the reservoir (Walsh 1989).

Rock Creek Reservoir is located just west of Deer Lodge along the eastern slope of the Flint Creek Range. The dam is owned by the Castle Mountain Ranch, Inc. In a phone conversation with Richard Pickering, ranch manager, he said that they did investigate expanding the reservoir. From an engineering perspective, he said it would be feasible but the costs were prohibitive (Pickering 1989).

53. In the section on water quality beginning on page 25 of the draft EIS, we state:

> Silver Bow Creek carries high levels of dissolved copper, cadmium, zinc, and iron into the Clark Fork. The Silver Bow Creek "Superfund" site was recently extended downstream to include the Clark Fork from its headwaters to Milltown.

The Environmental Protection Agency has identified 77 specific contaminated sites within this Superfund cleanup area, but contamination is not confined to these sites. Heavy rains, runoff, and stream action distribute metals and other pollutants downstream from many of these sites. See Chapter Three of this final EIS for an update on Superfund activities in the upper Clark Fork basin.

54. The ponds reduce dissolved metals loads in the outflow by allowing metal precipitates to settle. The ponds are less effective in winter because of a reduced pH in the ponds, the formation of an ice cap (which reduces the total pond volume and therefore decreases flow retention and precipitate settling time), and a general reduction in algal growth, which reduces potential algal uptake of metals and precipitates. Lime is added to the ponds in winter to help compensate for the naturally reduced pH.

Also paragraph 3, why hasn't the state required the owners of this system to maintain it at its design level, thus reducing contamination. What are the options being studied for treating the bypass water?

55

56

(response 54, continued)
Maintaining dilution flows is only one of several objectives of the requested reservations; delaying a decision on DFWP's application would unnecessarily jeopardize the other objectives. A successful cleanup would enhance aquatic habitat, but would not reduce the need for instream flows to provide fisheries and recreational opportunities. A reservation would protect such opportunities from the effects of future depletions.

When the draft EIS was prepared, the investigations at the Warm Springs Ponds were incomplete. Now the Phase II Remedial Investigation and the Feasibility Study have been completed. These studies provide detailed analysis of the contamination problems at Warm Springs Ponds and an evaluation of the different ways to correct the problems. EPA and DHES are preparing responses to public comments on the Feasibility Study and the Record of Decision, due to be released in the fall of 1990. The Record of Decision will identify which approach was chosen to solve the problems at the ponds. EPA and ARCO will then negotiate an order to begin work. If negotiations fail, litigation over the cleanup could follow.

55-56. The Mill-Willow Bypass contains accumulations of metals that, when flushed by intense thunderstorms, have adversely affected water quality and caused numerous fish kills. The short-term option chosen for "treating" the bypass water is the placement of a dike (by ARCO) in the bypass from July to September that diverts the water to the ponds for treatment.

The ponds are a high-priority project under the Superfund program, and EPA and DHES are currently overseeing several actions to address water quality concerns in the Mill-Willow Bypass during storms and resultant runoff. During the summer of 1990, ARCO diverted Mill and Willow creeks into the ponds and removed all tailings from the Mill-Willow Bypass. This should eliminate the major source of metals that have caused fish kills. Under order from DHES, ARCO is also building berms around all tailings deposits for about 10 miles downstream from the ponds. These berms will help prevent runoff of more metals into the Clark Fork during and after storms.

As part of the effort to clean up the Warms Springs Ponds, ARCO will study upstream contamination sources in Mill and Willow creeks to determine whether it is best to remove the sources or treat the water at the ponds. Further, EPA and DHES are studying contamination sources and cleanup options for Superfund sites on Silver Bow Creek upstream of the Warm Springs Ponds. Eventually, action at these sites will remove the need to treat Silver Bow Creek water at the ponds. An update of Superfund activities along the Clark Fork can be found in Chapter Three of this final EIS.

	10	(4th)	#2. How does a reservation on Flint Creek affect water availability on North Fork Lower Willow Creek? Figure 2-1 indicates that DFWP is not asking for a water reservation of the North Fork Lower Willow Creek. Please explain.
57			
	18	(1st)	With 25 years of flow records can you be more specific, is it 3,4 or 5 years in 10? Are there any flow records prior to 1961?
58			
59	21	(5th)	How many potential productive acres are involved?
60	23	(6th)	If the county did buy these rights, could it transfer, or trade for water in Willow Creek?
61	24	(Fig. 4-1)	What is the function of the opportunity ponds?

57. By obtaining a reservation at a point on lower Flint Creek, DFWP could call upon all junior water users located upstream, including those on upstream tributaries such as the North Fork of Lower Willow Creek, to cease diverting water when downstream flows drop below DFWP's reserved amount. See also the response to comment 192.

58. As measured at Noxon Rapids Dam for the period of record (1961 to 1986), flows in excess of WWP's claim of 50,000 cfs generally occur only during the end of May and the first half of June. From May 25 to June 17, there is an average flow of 55,850 cfs in 5 years out of 10, but this average conceals days within the three-week period on which the flow is less than 50,000 cfs. On a less frequent basis, for example in 3 or 4 years out of 10, there would be fewer days on which flows drop below 50,000 cfs.

    There are no streamflow records prior to May 1960 at Noxon Rapids.

59. Hydrometrics, a Helena consulting firm working on the Superfund cleanup, estimated that one million cubic yards of tailings covering about 1,250 acres have been deposited on the floodplain between Warm Springs and Deer Lodge (Hydrometrics 1983). These estimates are based on a field examination and aerial photo interpretation. Reclamation would be required to make these acres productive again. No reliable estimates are available for the level of damage or the amount of affected acreage along the reach from Deer Lodge to Drummond.

60. If these rights were purchased, the county commissioners would have to seek a change in the purpose of use and place of use (Warm Springs Creek drainage to Flint Creek drainage). Other water users would have an opportunity to object (§ 85-2-402, MCA).

61. In the past, tailings from operations at the Anaconda smelter were slurried into a series of ponds called the Anaconda and Opportunity ponds. Together, the ponds cover about 4,000 acres. They serve no real "function" other than to house the tailings.

    In addition, the City of Anaconda discharged its municipal wastes into the Opportunity Ponds. Recently, Anaconda has chosen to dispose of its municipal wastes in a different manner and will no longer use these ponds.

62	25	(4th)	Last sentence, what are the comparisons? Quantify.
63	25	(5th)	EPA "Superfund" site. When will it be cleaned? How much money is budgeted for the clean-up?
64	27	(4th)	First sentence; most metals - define which ones & % removal. Last sentence; this study is over 4 years old and it was only conducted once and limited to a short period. This does not seem to be representive of the past 50 years. If additional tests were conducted the statement could be verified. Can the water be treated for the two weeks in which the metal concentrations increased?

62. Water quality data provided by DHES for tributary streams entering the Clark Fork are presented in tables 3-4, 3-8, and 3-9 in Chapter Three of this final EIS.

63. The Superfund process in the headwaters is complex and at times arduous. It requires a series of remedial investigations, feasibility studies, negotiations, and possibly litigation. There is no way to say when the site will be "cleaned"; indeed, the decision as to "how clean is clean enough" is yet to be made. There is no definite budget for the cleanup; costs cannot be estimated until the preliminary studies are concluded and remedial actions are chosen. The ultimate scope and cost of the cleanup depends on the results of negotiations or litigation. See Chapter Three of this final EIS for a description of the status of the Superfund sites in the upper Clark Fork basin. EPA published a Master Plan for the Clark Fork Superfund actions in October 1988.

64. From December 1984 to August 1985, contractors for DHES investigated the Warm Springs Ponds to determine how effective the ponds were at removing metals from the water. Investigators found that, overall, removal efficiencies were about 87 percent for cadmium, 73 percent for lead, 65 percent for copper, 61 percent for zinc, 58 percent for iron, and 35 percent for arsenic. The metals removal efficiencies exhibited seasonal variations during this investigation with highest metal removal efficiencies occurring during the summer. From June 1 to September 15, 1985, the removal efficiencies for copper and zinc were 97 percent and 96 percent respectively (Tuesday and others 1987).

This study was not intended to be representative of the last 50 years. The referenced study and subsequent studies in the springs of 1987 and 1988 were conducted to understand how metal concentrations change during high spring flows. Unfortunately, the more recent studies did not yield much new information because of low runoff during the study period.

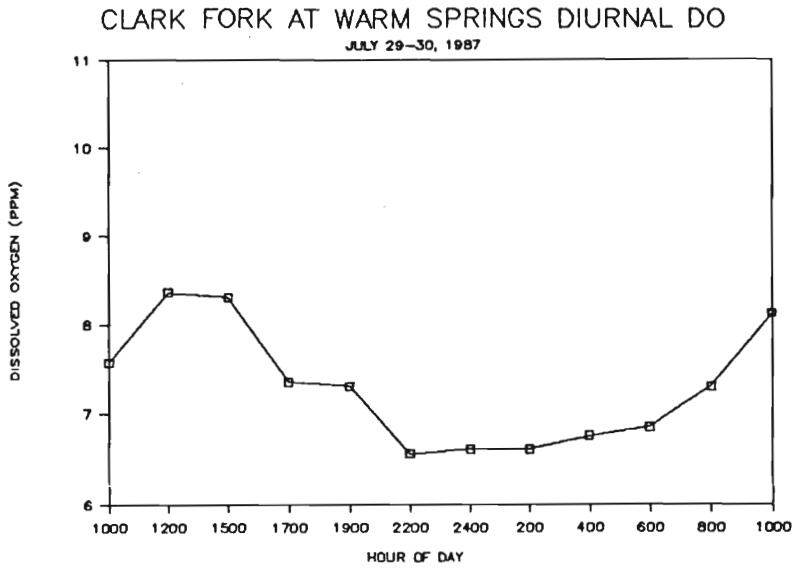
It is unknown whether all the water flowing in the Clark Fork during spring could be economically treated to reduce metal concentrations. Present Superfund studies are focusing on identifying the locations of metal-laden sediments in the floodplain with the hope that these sediments could be stabilized in place or that the areas with the highest concentrations could be removed.

65	27	(6th)	Clark Fork is a Class B-1 stream. On page 35, 2nd paragraph you say Class 2 stream. I'm confused on what a Class 2 stream is. You have not defined this Class, also the next paragraph rates most tributaries as Class 2 or 3. Define Class 3 stream and Class 1. Are these different than Table 4-2 on page 26. If so, why?
66	32	(2nd)	Dissolved oxygen levels on July 29 & 30, 1987 were lowest between midnight & 2 A.M. What were they? Please quantify.

65. Two separate stream classification systems are referred to in the draft EIS. As noted on pages 25 and 26, DHES has classified the Clark Fork as a B-1, C-1, or C-2 stream for water quality purposes. DFWP ranks streams in the state according to their fishery value with Class 1 being an outstanding fishery, Class 2 a high-value fishery, Class 3 as a substantial fishery, and Class 4 a moderate fishery (DFWP 1986).

66. The concentration of dissolved oxygen varied from one location to another during the July 29-30, 1987 sample run. Figures 4-1 through 4-7 show the results of the predawn dissolved oxygen sampling.

Figure 4-1



(response 66, continued)

Figure 4-2

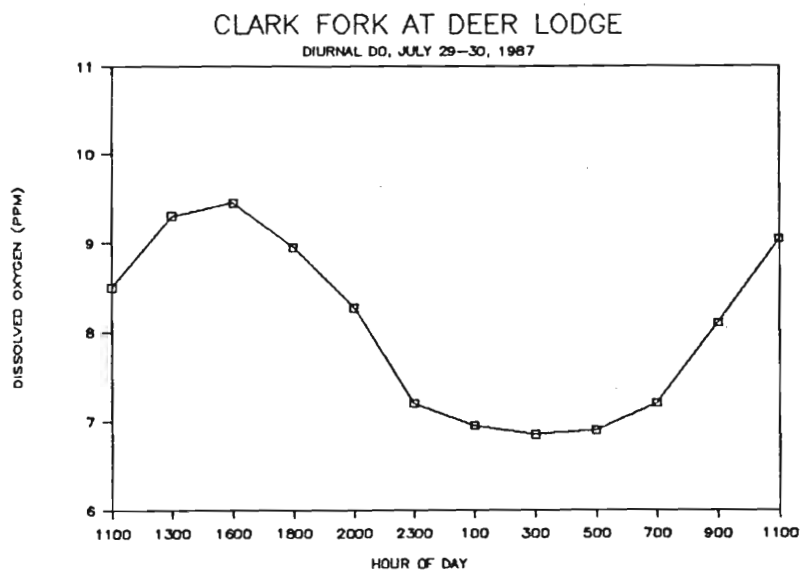
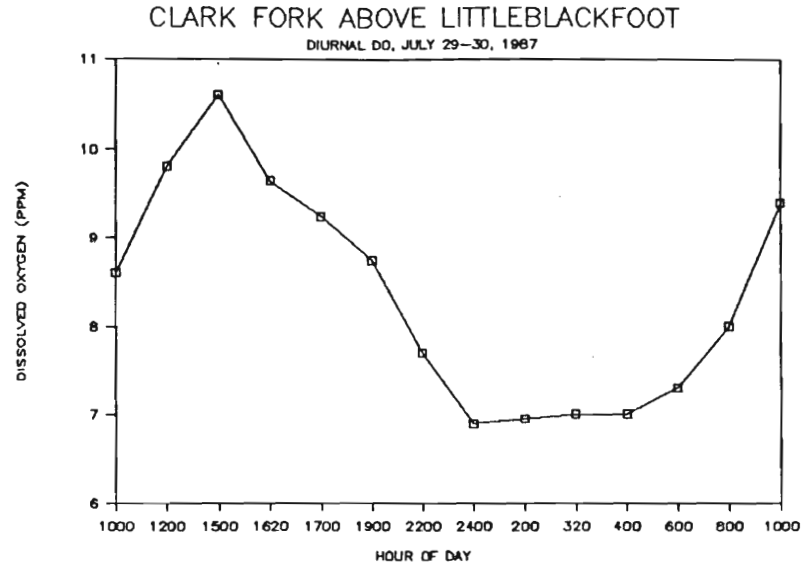


Figure 4-3



(response 66, continued)

Figure 4-4

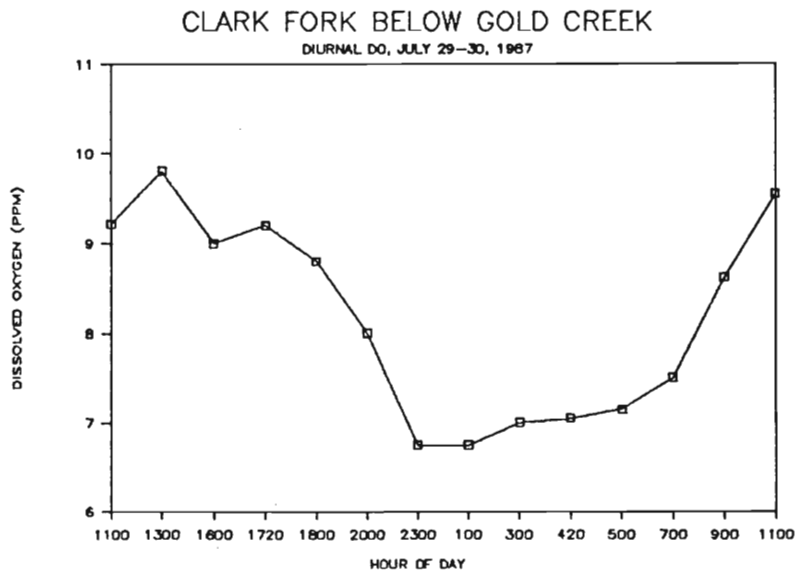
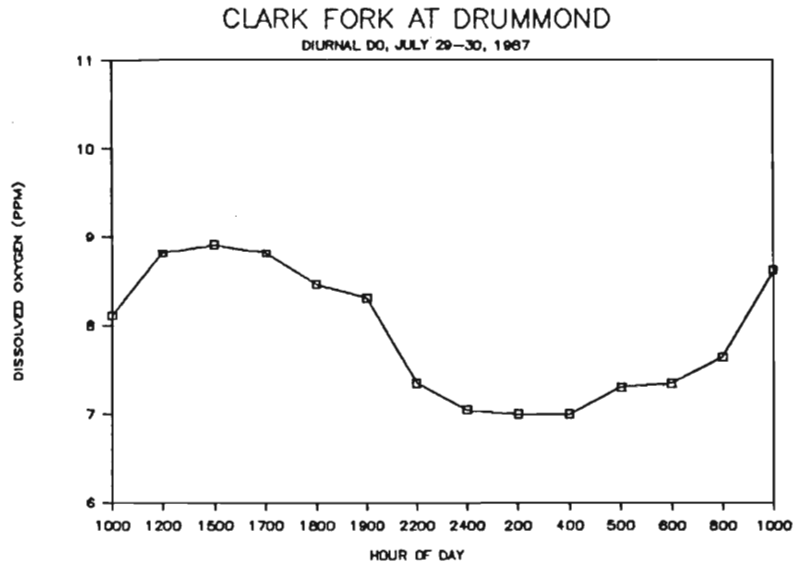


Figure 4-5



(response 66, continued)

Figure 4-6

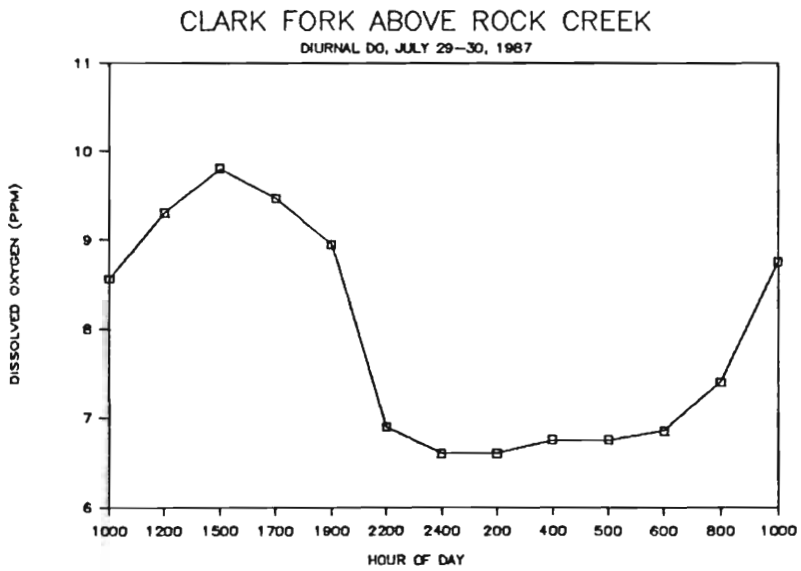
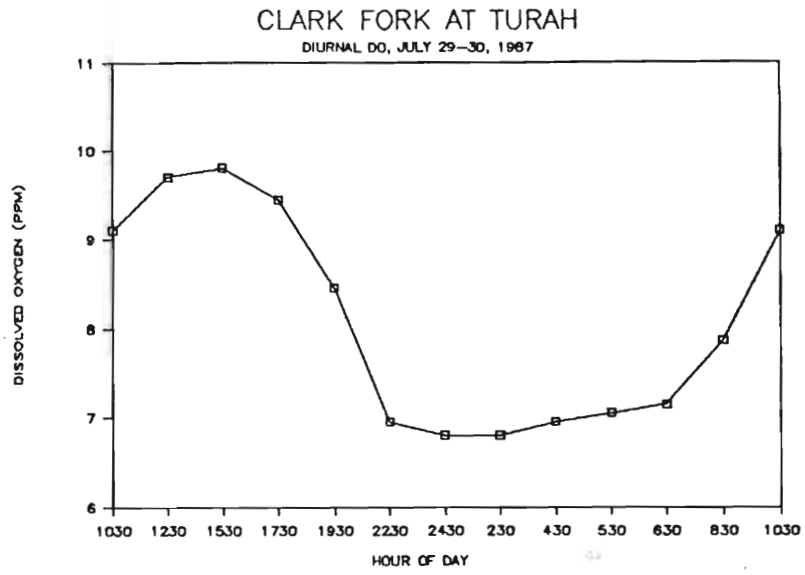


Figure 4-7



67 ranged from 6.3 to 8.4 mg/l. Present samples Is 7 mg/l the minimum recommended?

67. Dissolved oxygen concentrations less than 7 mg/l are not allowable for streams classified as B-1 or C-1 under BHES water quality standards. In streams classified as C-2, dissolved oxygen concentrations must not be reduced below 7 mg/l from October 1 through June 1 and below 6 mg/l from June 2 through September 30 (see page 26 of the draft EIS). The EPA's recommended criteria for salmonids (trout and their relatives) and associated food organisms are shown below in Table 4-1. Meeting these criteria does not ensure that organisms will be protected from adverse effects.

Table 4-1
Water Quality Criteria for Ambient Dissolved Oxygen Concentration.

	Cold Water Criteria		Warm Water Criteria	
	Early Life Stages[a,b]	Other Life Stages	Early Life Stages[b]	Other Life Stages
30-Day Mean	NA[c]	6.5	NA	5.5
7-Day Mean	9.5 (6.5)	NA	6.0	NA
7-Day Mean Minimum	NA	5.0	NA	4.0
1-Day Minimum[d,e]	8.0 (5.0)	4.0	5.0	3.0

a These are water column concentrations recommended to achieve the required intergravel dissolved oxygen concentrations shown in parentheses. The 3 mg/L differential is discussed in the criteria document. For species that have early life stages exposed directly to the water column, the figures in parentheses apply.
b Includes all embryonic and larval stages and all juvenile forms to 30 days following hatching.
c NA (not applicable).
d For highly manipulatable discharges, further restrictions apply.
e All minima should be considered as instantaneous concentrations to be achieved at all times.

Source: EPA 1986

68			What mortality rate occurs if the dissolved oxygen level falls below 7 mg/l?
69	32	(3rd)	2nd column; "possibly because", do you have back-up data to say this or not? Is this not conjecture? If not, say so. Their are other possible reasons, ie temp., rain.

68. The general level of effect of reduced dissolved oxygen is shown in Table 4-2. Because of related factors such as temperature, metals, or other environmental factors, it is not possible to say precisely what the mortality rate due to reduced levels of dissolved oxygen would be in the Clark Fork.

Table 4-2
Dissolved Oxygen Concentrations (mg/l) Versus Level of Effect.

1.Salmonid Waters			
a.	Embryo and Larval Stages		
	No Production Impairment	= 11*	(8)
	Slight Production Impairment	= 9*	(6)
	Moderate Production Impairment	= 8*	(5)
	Severe Production Impairment	= 6*	(3)
b.	Other Life Stages		
	No Production Impairment	= 8	
	Light Production Impairment	= 6	
	Moderate Production Impairment	= 5	
	Severe Production Impairment	= 4	
	Limit to Avoid Acute Mortality	= 3	

(Source: EPA 1986)

(* Note: These are water column concentrations recommended to achieve the required intergravel dissolved oxygen concentrations shown in parentheses. The 3 mg/L difference is discussed in the EPA criteria document.)

69. Dilution flow from tributaries is one possible explanation of higher species diversity. Data from Ingman (1987) and McGuire (1987) show a gradual change in water quality and a gradual increase in the number of species and their relative abundance (taxa richness and shannon diversity indices) at stations below the Little Blackfoot River. Ingman explained the gradually improved water quality in the Clark Fork below the Little Blackfoot as a result of dilution from relatively clean tributaries. No temperature gauges are installed in the Clark Fork immediately above and below the confluence of the Little Blackfoot to support or refute temperature as an explanation. Rainfall is only significant in that it would add "clean" water to a river or tributary if it did not pick up pollutants as it traveled down that tributary. Thus, rain could contribute to tributary dilution flows.

70	33	(9th)	Class "C" - is this Class C-1 or C-2? Is there a Class C? If so, define. Last sentence. Maybe-is it or not? State with
71			fact and specifity.

70. Classes C-1 and C-2 are defined on page 26 of the draft EIS. Since the draft EIS was published, DHES has approved a Class "I" (Improving) water quality classification for Silver Bow Creek. A Class I designation is given to streams that are recovering from serious industrial pollution problems.

    Under a Class I designation, water quality goals are established for a water body. In Silver Bow Creek the goal is to improve water quality to meet a Class C-2 designation. The DHES regularly monitors Class I streams to measure progress toward achievement of water quality goals.

    The Butte-Silver Bow sewage treatment system treats wastewater sufficiently to meet a Class C-2 water quality standard (Shewman 1989). At least one study is now underway to determine more precisely the sources of nutrients in the upper basin (DHES 1989). See the discussion on water quality in Chapter Three of this final EIS.

71. See the water quality discussion in Chapter Three of this final EIS. The Clark Fork monitoring data for 1986 and 1987 presented in Figure 4-4 (page 31) of the draft EIS indicate that the frequency with which total soluble inorganic nitrogen (TSIN) measurements exceed DHES criteria for prevention of nuisance algae growth is highest immediately below the outflow from the Butte wastewater treatment plant. TSIN concentrations and associated load decrease in the Clark Fork below Warm Springs Creek. A recent DHES study (1989) revealed that, from July through December of 1988, mean TSIN concentrations in the upper basin were highest as measured at the discharge from the Butte wastewater treatment plant. TSIN concentrations from the Galen wastewater treatment plant discharge ranked second, followed by TSIN concentrations in the discharge from the Deer Lodge lagoon.

72	34	(3rd)	Dissolved metals are thought - did they or didn't they? Any factual proof? If so, state it.
73	35	(2nd)	Class 2? Next paragraph. Class 2 or 3? As mentioned before, I am confused on what classes you refer to and definition of those classes.
74	39	(7th)	Recreation along Clark Fork tributaries. I was involved in a large recreational survey on site and later by mail after I fished & camped on Rock Creek last year (Summer 1988). The results should certainly be available now. Why haven't you included them here?

72. Researchers know that fish populations are lower in the upper Clark Fork than in other rivers of similar size, but our scientific understanding of why this is so is still incomplete. As with most natural systems, there are probably several contributing factors. Metals concentrations do reach levels that are toxic to fish, particularly in the reach just below the Mill-Willow bypass after intense rains. However, other stresses to fish, such as elevated water temperatures or low levels of dissolved oxygen, may also harm the fishery, particularly when they occur together. Depleting streamflows may worsen the effects of these stresses. Although researchers studying the upper Clark Fork basin have identified various sources of stress to fish, no one has yet determined how much damage is due to any one source of stress. The draft EIS presented a variety of possible explanations:

1. Metal contamination (draft EIS, pages 27, 29, 34)
   - metals can reach levels toxic to fish during spring runoff, during summer cloudbursts, and during the winter below the Warm Springs Ponds
   - the diversity of aquatic insect populations (food for trout) is higher in river reaches below relatively clean streams flowing into the Clark Fork (draft EIS, page 32) (See response to comment 69)
2. Depressed levels of dissolved oxygen
   - levels below 7 mg/l are thought to be detrimental to aquatic life (food organisms for trout). Such levels occur in the early morning hours and have been recorded in low-flow years (see responses 67 and 68 and pages 29-32 in the draft EIS).
3. Other habitat conditions including fine grained sediments near Deer Lodge and Bearmouth (draft EIS, page 34) which may limit trout spawning.
4. Severely reduced flows during the irrigation season near Deer Lodge (draft EIS, page 34)

73. See the response to comment 65. Different stretches of the Clark Fork have different fisheries value rankings. From Bonner to Rock Creek, the Clark Fork is rated as a Class 2 fishery; from Rock Creek to Dempsey Creek as a Class 3 fishery, and from Dempsey Creek to Warm Springs Creek as a Class 2 fishery.

74. DFWP has not requested an instream reservation for Rock Creek. Comprehensive recreational use information on this Clark Fork tributary is not necessary for this EIS.

75	46	(10th)	Industrial closures - what were they?
	53	(5th)	"The recreation would help ensure sufficient stream flow to supply existing rights and avoid a deterioration of water quality to the point that it could affect crop production."
76			This sentence deals with three distinct independent elements. It is real confusing to me to figure out the real meaning of this sentence. Please explain in more detail. The word diversing should be diversion.
77	54	(6th)	Depletion allowed by numerous future...define and quantify numerous.

75. Major industrial closures in the upper Clark Fork basin included the Anaconda smelter in Deer Lodge County, the Anaconda Mining Company operations in Silver Bow County, the Milwaukee Railroad repair facility in Powell County, and wood products manufacturing plants in Missoula County.

76. The paragraph containing the sentence in question has been rewritten to clarify the meaning as follows:

During low flow years in the upper Clark Fork basin, diversion structures often require additional maintenance in order to continue delivering water to the fields. If new permits result in additional stream depletions during low-flow conditions, diversion structures would require even more work and adjustments. An instream flow reservation might limit further depletions during low flows and therefore minimize the amount of additional maintenance required at existing diversion structures. A reservation would not alter the amount of dewatering allowed under existing rights, and existing diversion structures would need the same amount of maintenance as they receive now during low flows.

77. Additional consumptive uses of water continue to be permitted in the upper Clark Fork basin. Eventually, the cumulative effects of new uses may extend the time period when flows fall below 1,900 cfs in the reach where the Frenchtown mill discharges its wastewater. Cumulative consumption also might affect DHES's Q-7 wastewater treatment standards which are based on historical low flows over a seven-day period.

The amount of water consumed by individual water uses will vary, so it is not possible to predict how many new diversions it would take to adversely affect Stone's mill operations. Under existing conditions in an average flow year, new diversions totalling 587 cfs would drop January flows below 1,900 cfs at Frenchtown. Diversions of 670 cfs in August and 779 cfs in September would have the same result.

78	55	(2nd)	If the Superfund activities were carried out, would a reservation be needed?
79	55	(4th)	Last sentence: "Instream reservation probably would help maintain..." How?
	56	(Top)	Last sentence. Instream reservations would help prevent such cost increases. But this seems like you are burdening the farmer and rancher. They aren't the ones causing bad effluents into the stream. The people in the cities are. Make them pay the price to clean up their wastes. Don't make the farmer fight a legal battle for a beneficial water use to which he already has a right to.
80			

78. DFWP is requesting instream reservations not only to protect water quality, but also to provide the quantity of water needed to preserve the aquatic habitat, fisheries, and recreational resources. Even if the Superfund cleanup is successful—and dilution flows could be reduced—the reservations would still serve these other purposes.

In its request for instream flow on the tributaries, DFWP acknowledges that winter dilution flows will not be needed once metals concentrations in the Clark Fork reach acceptable levels. Accordingly, if the Superfund cleanup is successful, the amount of water reserved during the winter on each tributary would be reduced. The reservation on each tributary would revert to the amount of water needed year-round to maintain aquatic and recreational resources. Table 2-1 in the draft EIS lists the flows requested year-round. This table is reprinted as Table 2-1 in the final EIS.

79. The population levels of the upper basin counties are influenced primarily by employment levels. If employment levels remain steady, then population levels are less likely to rise or fall. DFWP's requested reservations would not affect the basin's economy as profoundly as other factors, but by preventing further depletions the reservations could help to sustain businesses and industries that depend on existing flows. This, in turn, would help to maintain employment—and hence population—at current levels in the upper basin.

80. Unappropriated water in the Clark Fork basin belongs to the state to be used by all of the people of Montana. Uses other than agriculture are also beneficial, including domestic, fish and wildlife, industrial, mining, municipal, power, and recreation. These uses are entitled to compete for a portion of available flows.

It is true that setting aside instream flows in the upper Clark Fork to protect water quality, fisheries, and recreational resources will present some costs to agricultural users, primarily in the form of reduced opportunities for future irrigation development. But from another perspective, using water for irrigation presents costs to other uses in the form of reduced opportunities for fishing and boating, providing aquatic habitat, diluting waste discharges, and developing new industrial uses. If water is in short supply, the value of each use must be weighed against its "opportunity cost" to other uses. The Board will consider this issue when acting on the requested reservations.

81	56	(2nd)	Discharge of treated waste water for Anaconda-Deer Lodge. Are there any studies to back up the economical options for discharges into Warm Springs & Clark Fork? Is there an increased tax base here due to population increase? Or is their a decrease in population and thus a decrease in waste water?
82			
83	62	(top)	Last sentence, I don't agree. Due to more crop land there is more feed available for deer. You also say this later in the DEIS on page 67, Col. 1, last paragraph. What is the case here?
84	64	(6th)	Your quote from DFWP 1986b is unclear. Are there endangered species in the study area? If so, what are they?

81. Anaconda-Deer Lodge hired the consulting firm of Thomas, Dean, and Hoskins to identify and analyze alternatives for disposal of the community's wastewater. The consultant evaluated the economics of the various disposal alternatives (Manning 1987).

82. The real dollar valuation of the tax base in all of the upper basin counties has decreased in the last decade. Industrial closures (see comment 75) and lower taxable valuations assigned to certain classes of property are the major reasons for the decreases. For more information about tax bases in the five county area, see the response to comment 148.

    In areas where industrial closures and population losses have occurred, there has been a decrease in the amount of wastewater produced.

83. The GCD reservation request for the North Fork of Lower Willow Creek (addressed on page 62 of the draft EIS) would increase the productivity (tons/acre) of currently irrigated land. The acreage of cropland would not change. Since wildlife can use a wide variety of foods, increasing the productivity of existing cropland would have almost no effect on wildlife. The statements on pages 67 and 72 of the draft EIS address the potential for creating new cropland or the loss of that potential. Developing new cropland (or restricting its expansion) would have a much greater effect on wildlife than increasing the productivity of existing cropland.

84. There are no endangered fish species in upper Clark Fork basin.

67 (2nd) "Lower instream flows...place." But you say in this report that future diversions are not likely and that there is not additional economic arrable land. In addition you review all filed water rights. So, how does the above statement relate to future diversions? And, you also said before on pages 54 & 55 that 10 new applications are requested each year. Please expand and relate everything together in summary form. For example: Quantify the application; # of applications; amount approved; where; future projections; amount of depletion; return flows.

85

85. On page 22 of the draft EIS, it is noted that DNRC identified 8,362 acres of undeveloped irrigable lands in the upper Clark Fork basin. These lands could be economically irrigated, and water is physically available to them in 8 years out of 10 for irrigation. Other uses of this water are possible besides irrigation.

Since 1973, DNRC has issued 96 provisional water-use permits for flows greater than 100 gallons per minute in the upper Clark Fork basin (excluding Rock Creek) and 14 in the Flint Creek drainage. These permits are described as follows:

Table 4-3
Water Use Permits Issued Appropriating At Least 100 GPM of Surface Water as of 8/20/90 (Excluding Rock Creek and Blackfoot River)

# Permits	Use	Volume of Use (af/yr)
	UPPER CLARK FORK BASIN (76G)	
37	Irrigation	6,090.48
19	Domestic	70.96
11	Mining	2,985.61
10	Fish & Wildlife	8,202.37
3	Stock Watering	6.15
1	Fire Protection	1.49
81	**Subtotal**	**17,358.06**
	FLINT CREEK BASIN (76GJ)	
10	Irrigation	4,000.6
2	Hydropower	10,014.23
2	Mining	48.99
1	Fish & Wildlife	5,840.00
15	**Subtotal**	**19,903.82**
96	**Grand Total**	**37,261.88**

The permits do not specify the amount of depletion or the percentage of water diverted that returns to the stream. Page 115, paragraph 4, of the draft EIS describes how DNRC analyzed the effects of return flows. Additional information is provided in responses to comments 257, 267, and 268.

86	67	(5th)	Land Use Impacts Please list and explain what the detrimental effects to existing irrigators are.
87	71	(2nd)	Last sentence-"Deer and waterfowl would find additional forage in these croplands". On page 62 & 67 you say the opposite.
88	71	(4th)	Land Use Impacts, last sentence. This is confusing. How can instream flow reservations be appropriated? What incidental benefits accure to irrigators?
89	71	(8th)	Last sentence. If this true & more water is required, why doesn't Stone Container Corporation file for additional industrial water rights? That way they would always be protected.

86. Further reductions of flow could adversely affect existing irrigators. Lower flows could require additional or more frequent maintenance at diversion structures to ensure water delivery. The affected irrigators would have to spend additional time and money, either for maintenance or to object to new permits, to protect their water rights.

87. See the response to comment 83.

88. The sentence in question has been revised to clarify its meaning as follows:

    If DFWP's instream flow requests are denied and the water is appropriated for other uses, the incidental benefits that otherwise might have accrued to existing irrigators would not be present.

    For a discussion of these incidental benefits, see the responses to comments 76 and 86.

89. The sentence states that "Stone Container is concerned that the cumulative depletions allowed by numerous future consumptive use permits could increase its wastewater treatment costs (Weeks 1988)." While Stone Container Corporation would benefit from maintaining stream flows for dilution, Stone Container is not eligible to receive such a right. Under the water reservation statute (§ 85-2-316, MCA), only a public entity such as DFWP can hold a water reservation for these purposes. However, DFWP's requested reservations would protect instream flows above Milltown Dam and would only indirectly benefit flows in and below Missoula. Also see the response to comment 77.

    If DFWP's requests are denied, and if the basin is not closed, under Case 2 there would be few constraints to the amount of water that could be diverted by future development. Numerous future depletions could cumulatively impair the river's capacity to support recreation and related economic activity.

90	72	(1st)	Last sentence. Do you have any back-up data for this statement? Please provide some.
	73	(3rd)	Last sentence. Can you give some documentation to back up this statement? How much appropriated water are you talking about? Based on current trends (other uses) how long will it take to affect fish and wildlife habitat?
91			

90. The Missoula Redevelopment Agency has commented that noticeable decreases in flows or water quality would adversely affect public and private investments in the Missoula river front area (Badenock and Behan 1988). The University of Montana and businesses located along the river front use the area's aesthetic and recreational qualities as part of their marketing programs (Badenock and Behan 1988). For further discussion of the effect of DFWP's requested reservations on flows below Milltown Dam, see Chapter Three of this final EIS.

If diminished flows or water quality in the Clark Fork contribute to lower participation in recreation along the river, businesses catering to Clark Fork recreationists would be adversely affected.

91. If existing water rights do not constrain development and if water is not reserved for instream flows, the water could be appropriated and put to other uses. Since 1973, consumptive use development in the upper basin has been slow, averaging about three permits a year, but such development would likely continue. The most probable future use of water in the basin is irrigation. In the draft EIS, DNRC identified 8,362 acres of undeveloped irrigable land in the upper Clark Fork basin (page 22 and Table D-6 in Appendix D) and estimated future depletions based on this level of development (pages 69-70 and Table 5-7).

See the response to comment 85 for a discussion of potential appropriations of water in the basin.

In some reaches, existing water uses have already adversely affected fish habitat. Residents of the upper basin who attended public meetings on the draft EIS identified the following streams as having portions that go dry during the summer: Dempsey Creek, Racetrack Creek, Warm Springs Creek, and Lost Creek. In addition, the reach of the Clark Fork above Deer Lodge is nearly dewatered in dry years during the irrigation season (see page 14 of the draft EIS). See Table 3-2, listing recorded low flows, in the section on streamflows in Chapter Three of this final EIS.

A review of stream gauging records reveals that zero or near-zero (0.1 cfs) flows have been recorded on Warm Springs Creek by both USGS and DHES. No other near-zero flows were found in the flow records for Racetrack, Dempsey, and Lost creeks or the Clark Fork main stem near Deer Lodge. According to 1988 USGS records, the lowest flow recorded for the Clark Fork at Deer Lodge is 22 cfs (USDI 1989), which is nearly dewatered for that stretch. Zero flows may have occurred in years beyond the period of record on these streams.

The precise relationship between flow volume and numbers or pounds of fish produced has not been quantified on any of the stream reaches where reservations are requested. However, a stream cannot support a flourishing fish population when severely depleted or dry. DFWP is requesting reservations on these streams to protect aquatic habitat from further depletions.

92	74	(2nd)	DFWP If recreational use increases, is there a use rate that is detrimental to the Clark Fork or its tributaries? The study conducted last year touched on this fact. Last sentence. How can the costs be higher?
93	75	(1st)	You mention value of boating on the Clark Fork. From your study you said less that 10% of the recreation is spent on boating. What is the value you place on the activity?
94	75	(7th)	First sentence. Please explain how and why junior appropriators would be significantly reduced. Define significantly. Last sentence. Why don't the industries and municipalities apply for additional water rights if this is a problem?

92. Recreational use levels on the upper Clark Fork are currently below capacity, although some reaches, such as the reach below Warm Springs Creek, receive heavier use (Bastian 1990). Dramatic increases would have to occur before use rates would be detrimental. Of the upper Clark Fork tributaries, Rock Creek experiences some degree of user congestion between bank fishermen and floaters during early summer, and the Blackfoot River sustains heavy use.

DFWP's reservation would impose costs by preventing other uses of water or making those uses more expensive. A larger demand for water would mean that DFWP's reservations would prevent or interfere with new uses and, therefore, impose more costs to these potential water users.

93. As stated in the draft EIS, there have been no studies attempting to estimate the value boaters place on their use of the Clark Fork. Studies have been conducted on some other streams in the western U.S. See, for example, Ward 1987; Walsh et al. 1980; and Daubert, Young, and Gray 1979. These studies have found values ranging from about $10 per day to well over $100 per day. With no estimates for the Clark Fork and such wide variation in estimated values on other streams, DNRC attempted only to place an upper limit on the order of magnitude of the benefits from boating.

94. The draft EIS states that "if existing water rights constrain future development, water available for junior appropriators would be significantly reduced." The Clark Fork main stem is highly appropriated. For example, WWP's claimed water rights total 50,000 cfs at Noxon Rapids, with a priority date of November 19, 1974, and account for nearly the entire flow of the Clark Fork in most years. And in tributaries of the main stem, irrigation water right claims account for most, if not all, of the flow from May through September. To date, WWP has not objected to any new permits, nor has it called on junior water users when flows have dropped below 50,000 cfs at Noxon Rapids. But if holders of these claimed rights object and the objections are upheld, water in excess of WWP's claim would be available only in May and June—and then only in some years—and senior irrigation claims could further limit new appropriations or junior uses in May of most years.

Industries and municipalities in the upper Clark Fork basin rely on instream flows to dilute waste discharges, and some company and city officials have recently expressed concern over the cumulative effect of further depletions on instream flows. Industries, by law, are not eligible to reserve instream flows, though they can lend support to municipal, county, state, or federal reservation applications.

Municipalities are eligible to reserve instream flows, and DNRC solicited applications from cities and towns in the Clark Fork basin early in the reservation process. No municipal applications were received.

	76	(4th)	I don't agree that limited industry or mining, or if it occurred in the more distant future, would cost less. It is possible that
95			a larger mining operation would well afford the costs associated with such a venture. The cost to fight for water rights would be costly in either case.
	77	(5th)	Public Health & Welfare and Safety would be adversely impacted. You have stated several
96			times that more water may be needed for industrial and waste water dilution.
	77	(9th)	Costs The costs of power at the Columbia River Plants are $52,000 and in Montana $3,000. Thus, $55,000 for 4950 AF of storage per year would be lost. That makes an AF of
97			the water worth about $11.11. Why don't the farmers sell all their rights to the power companies? This would increase flows during times of low flow and the water isn't depleted. Have you figured out the value of an AF of water to the farmer if he did sell his water right to the power company? What if he sold his rights to DFWP?

95. If the DFWP reservations prevented new appropriations for industrial or mining use, new industries or mines could buy existing water rights. Because smaller developments would use less water, less money would be spent to purchase water rights.

The value today of a cost or benefit is lower the farther in the future it occurs. With a 4.6 percent discount rate, $10 million 10 years in the future is worth $6.4 million today, while the same value 20 years in the future is worth $4.1 million today.

96. DFWP's requested instream flow reservations would help protect public health, welfare, and safety. During low-flow conditions, the reservations would keep water in the upper Clark Fork and 17 of its tributaries, thus providing dilution flows and preventing the deterioration of water quality. The comment seems to imply that DFWP's reservations would not allow future diversions of water to dilute wastes off-stream. However, wastes typically are diluted by being discharged into the stream. The draft EIS states that instream flows are needed to dilute waste discharges, not that water would need to be diverted for dilution.

97. The net cost that GCD's project on the North Fork of Lower Willow Creek would impose through reduced electricity generation is due to the water consumed in irrigation, not due to the storage. In an average water year, the project would consume about 1,480 af, giving an annual cost of about $37 per acre-foot (the value of lost power production divided by 1,480 af equals $37/af).

An acre-foot of water flowing through all of the hydroelectric dams on the Clark Fork and Columbia River produces about 1,700 kWh of electricity with an annual value of about $40. However, both MPC and WWP have water right claims for the water they use and have no need to purchase water. If either company wished to expand its power plant in the future, they could consider buying existing upstream water rights.

DFWP cannot buy water rights for instream use and has only limited authority to lease water. DFWP has contracted with Bioeconomics Associates of Missoula to study the value of water for leasing. There are currently no leases planned in the Clark Fork. For more information on water leasing, see Chapter Three of this final EIS. As long as sufficient water is available for a reservation, DFWP has no need to lease existing rights.

98	79	(2nd)	Water There is a contested case hearing before the board now. Yellowstone County has asked for a declaratory ruling on the board's authority. Please address this fact and how it affects this EIS.
99	79	(3rd)	Land The land (if dam is abandoned) can be retrievable as well as the material used to build it, thus the project is also reversible.
100	81	(7th)	#5. Are there reasonable alternatives?

98. In the case that was before the Board, Yellowstone County requested that the Board reallocate all or portions of reservations held by the City of Billings, and that the reservations be transferred to Yellowstone County. Yellowstone County argued that reservations held by the City of Billings, the U.S. Bureau of Land Management, the City of Columbus, and the City of Livingston were not being used in accordance with the objectives of the original reservation.

    At its April 10, 1989 meeting, the Board ruled that it does not have the authority to involuntarily transfer a municipal water reservation to another qualified applicant. It is clear that the Board has the authority to reallocate instream reservations granted for the purpose of maintaining minimum flow or water quality. Instream flows can be reallocated to another qualified reservant if the Board finds, after notice and hearing, that all or part of the reservation is not needed and the applicant shows that its need outweighs the need shown by the original reservant. For all other reservations the Board only has the authority to "extend, revoke, or modify" those reservations if the objectives of the reservation are not met. The Board found that it has the power to modify Billings' original municipal reservation, but the power to modify does not encompass the power to transfer or reallocate any portion of Billings' reservation without Billings' consent to such a transfer.

    At this time the Board has not completed its 10-year review and has not decided what to do with the reservations held by Livingston or Columbus.

    In the Clark Fork proceedings, this decision serves to clarify the Board's authority.

99. It is unlikely anyone would voluntarily pay to remove an irrigation dam and reclaim the land. As a practical matter, most abandoned dams are simply breached and the remaining portion of the dam is left standing.

100. Alternatives to both DFWP's and GCD's reservations were discussed in chapters Five and Six of the draft EIS. Two alternatives to DFWP's instream flow request were identified: granting less than the request and denying the request. For GCD's North Fork of Lower Willow Creek proposal, one alternative that might provide greater net benefits was identified: using water from Georgetown Lake. DNRC also investigated reducing the size of the proposed North Fork of Lower Willow Creek reservoir, but this proved to be less feasible than the original project. For a description of the impacts of denying GCD's request, see the response to comment 135.

101	82	(4th)	#3. Define, outline and quantify the "some of the same water."
	94	(6th)	How about solving your two concerns first before a final EIS? A separate report, if given to the board, must also be given to the public for comment before a final EIS. The EIS is based on the amount of water availability. How can DNRC, the Board or other concerned person make informed and intelligent decisions without all the facts?
102			
103	100	(8th)	If stream flow generally increases; is this the case here?
	105	(7th)	Because the department deviated in two different major areas from the guidelines, how can the results of this study be reliable or accurate?
104			

101. As stated on page 59 of the draft EIS, DNRC's analysis found that the changed flow pattern in Flint Creek, as a result of GCD's Lower Willow Creek project, conflicts with DFWP's instream flow request in March and April under average flow conditions. See also the responses to comments 26 and 57.

102. Additional information on streamflows and physical water availability in the upper Clark Fork basin is presented in Chapter Three of this final EIS. As stated in the draft EIS, water availability is partly dependent on whether senior water right holders object to new appropriations and the objections are upheld. The forum for objections, and thus for determining water availability, is the contested case hearing. The contested case hearing is as important to the Board's decision-making process as the EIS process. The information presented at the contested case hearing will be used by the hearings examiner to formulate final recommendations. The contested case hearing will be open to the public, and, as part of the hearings record, these recommendations would be open to public scrutiny. This final EIS serves as DNRC's report to the Board; no separate report is anticipated.

103. Table B-1 on pages 125-129 in the draft EIS summarizes streamflows at various points and confirms that, in general, streamflow in the Clark Fork increases in the downstream direction. However, there are exceptions to this general rule. Certainly, the streamflow just below a canal diversion is less than the streamflow just above the same diversion. Similarly, there may be reaches of the Clark Fork wherein losses to groundwater from the river exceed surface inflows to the river.

Above Deer Lodge there is a reach of river that is dewatered from time to time due to irrigation diversions. According to local residents, the same holds true for the lowest portion of Warm Springs Creek (see the response to comment 91) and Dempsey, Racetrack, and Lost creeks. Flows in several other tributaries may be depleted in the summer.

104. The results of DFWP's wetted perimeter analysis represent the flow regime and channel configuration only at the study sites; see the response to comment 106. See the responses to comments 192 and 269 for a discussion of how DFWP has defined "reach" for the purposes of administering an instream flow reservation.

105	106	(6th)	Define "Murphy rights". Quantify them for each stream in the requested reservation.
106	107	(2nd)	Why don't you require that 3 or more cross sections be used to achieve accurate results?
107	108	(2nd)	#1. Does the slope change dramatically in this case?
108	112 & 113		The arrived at inflection points in Figure A-6 do not relate to the wetted perimeter nor flow as shown in Figure A-5. I realize that the locations of the reaches are quite far apart and Figure A-6 includes flow from Rock Creek. However, my interpretation of the figures follows: Flows below a lower inflection point are undesirable. Flows at or above the upper inflection point are desirable. You state that determining the upper and low inflection points can be somewhat subjective. It depends on the non-dramatic change of slope of the wetted permeter versus flow. However, I don't think you have plotted the slope of the wetted perimeter, have you? Your Figure A-5 and A-6 have wetted perimeter versus flow. The banks of the reaches have non-dramatic bank slope, in other words gradual slopes rather than the one shown on Page 99. To compensate for this problem, you have used different vertical versus horizontal scales when plotting Figures A-5 and A-6 to deliniate the inflection points, should this be done?

105. Murphy rights is the term commonly used to describe the water rights granted to DFWP by the legislature in 1969 (Chapter 345, Montana Law 879). This act allowed DFWP to appropriate the unappropriated waters on twelve streams designated by the legislature "in such amounts only as may be necessary to maintain stream flows necessary for the preservation of fish and wildlife habitat." According to DFWP (1986a): "These rights have priority over other water uses in the stream until the district court in the area should decide another beneficial use to be more appropriate. The 12 streams designated included seven which are designated 'blue ribbon' plus five others which are important trout fisheries in Montana." Although this provision was repealed by the 1973 Water Use Act, the water filings on the 12 streams are still valid since "existing rights" are recognized by the current water law as well as by Article IX Section 3(1) of the 1972 Montana Constitution. DFWP has not applied for reservations on Rock Creek and the Blackfoot River because it holds Murphy rights on these streams.

106. To grant DFWP's requested reservations, the Board must find that the methods used to determine the amount of water needed are "accurate and suitable" (ARM 36.16.107(3)). Using two measuring points instead of three may result in larger errors in plotting the relationship between wetted perimeter and flow. But it is up to the Board to decide whether the margin of error falls within the "accurate and suitable" criteria. See Table A-1 on page 109 in the draft EIS for a sample of the mean percent error associated with various numbers of measuring points used. See also the response to comment 194 and Chapter Two of this final EIS.

107. The x-y plots of wetted perimeter versus flow for each of the 25 stream reaches for which DFWP is seeking reservations are presented in Appendix A. The reader can look at the plots to determine how quickly the slope of this line changes. When comparing one plot to another, the greater the change in slope, the less subjective the identification of inflection points.

108. Slope here refers not to the stream bank, but to the angle of the line representing changes in wetted perimeter versus changes in flow. The slope of the wetted perimeter itself is not plotted. See also the response to comment 107. Due to page size and printing constraints, all graphs are not to the same scale; this may accentuate or conceal subtle changes in slope. But the data used to plot the lines are consistent from one graph to the next, and scale is accurately indicated along the x and y axes for each graph.

109	112	(Fig. 5)	From Figure A-5 you say that the lower inflection point is at a flow of 210 cfs and a wetted perimeter of 70 feet. This is sufficient for fish habitat. Figure A-6 has a lower infection of 320 cfs and 107 feet. If fish have sufficient habitat at 210 cfs and 70 feet on Reach 2 why now does it take 320 cfs and 107 feet on Reach 3? You have mentioned in this study that the farther downstream one travels the channel gets wider and increases in flow and as a result population of fish increase. You have not said that the flow versus wetted perimeter had to increase. A lower inflection of 200 cfs and 82 feet for Reach 3 provides sufficient fish habitat if Reach 2 does the same. Please explain why you have picked a higher value on Figure A-6. Can you really pick upper and lower inflection points based upon different scales? Maybe there are no discernible inflection points.
110	149	(Table)	Table D-1. If the updated EPA criteria are more stringent, why not use it? What is the state criteria? Compare by including this data in the same table. Are these test samples reliable and statistically sufficient so you can make informed judgements?
111	150	(Table)	Table D-2. Same questions as above. When were the samples taken? Two per year between 1975 and 1983? Again the number of samples seems insufficient.
112	150	(Table)	Table D-3. When were tests conducted? how long did the test last? What type of test is a Bioassay? What were time limits of test results in columns 3 and 4?
113	151	(Table)	Table D-4. Only five years data, some of which was during hot dry seasons. Results from 1982 to 1988 would show the recent dryness and effects of drought. What affect did this have on death rate of fish?

109. Riffle shape determines the amount of water needed to keep the sides and bottom of the stream wet. Different riffles will require different flow volumes. See the comment and response at 187.

The lowest inflection point in Figure A-6 occurs at approximately 160 to 200 cfs for Clark Fork Reach 3. There also appears to be at least one intermediate inflection point on this plotted line.

110. See the water quality section in Chapter Three of this final EIS.

111. See the water quality section in Chapter Three of this final EIS.

112. As explained on page 29 of the draft EIS, a bioassay is a test to measure the response of an organism to a potentially toxic or harmful substance over a period of time. Bioassays in the Clark Fork basin began on April 18, and ended on June 26, 1986. Fingerling rainbow trout were held at the seven sites described in Table D-3 on page 150 of the draft EIS. According to Phillips *et al.* (1987):

"...at each site except Silver Bow Creek, trout were held in two identical floating vessels constructed with a wooden frame and 3 mm mesh nylon netting. Each bioassay vessel contained about 40 fingerling trout, thus approximately 80 trout were held at each site....

During the test, mortality was monitored three times each week, and alkalinity, hardness, and pH were monitored weekly. Additionally, water samples were collected three times each week and analyzed for total recoverable copper and zinc. Water samples for a given week were composited during the majority of the test, but were analyzed individually during the peak runoff in late May and early June."

113. Recording temperature gauges were not operated during the most recent time period. The draft EIS (page 29) noted that the growth rate of fish would be depressed at temperatures above 66° F. It is not possible to say precisely what effect these temperatures had on the death rate of fish because numerous other factors also may contribute to mortality (see response to comment 72). Toxic materials generally become more toxic with increased temperature, and organisms subjected to stress from toxic materials are less tolerant of temperature extremes (EPA 1986).

114	151	(Table)	Table D-5. What effect did this have on death rate of fish?
	157	(1st)	Please give a breakdown of the major units of work and their corresponding unit price estimate. For example: 1. Borrow material 2. Place embankment 3. Gravel filters 4. Structural concrete 5. Control tower 6. Mechanical for controls 7. Spillway 8. Mobilization 9. Clearing, topsoil, seeding, etc.
115			

114. It is not possible to precisely describe the effect of these low levels of dissolved oxygen on the death rate of fish because other factors might contribute to low fish populations (see responses to comments 72 and 113).

115. The cost estimates provided in the draft EIS and in GCD's application are reconnaissance level estimates. As stated in GCD's application and in the draft EIS, if the reservation is granted, more detailed engineering and geotechnical information would be collected prior to project development. However, collecting this type of detailed, site-specific information is very expensive and will only be done if the project is built. Without this information, breaking down the costs into these detailed, site-specific categories is nearly impossible and, if done, would be no more accurate than the estimate already provided. See also the response to comment 36.

Cost estimates are broken down into three major dam cost categories: embankment, outlet, and spillway works. See Appendix E on pages 157 and 158 of the draft EIS for more detailed descriptions of these three categories and cost estimates.

RECEIVED
FEB 08 1989
MONT. DEPT. of NATURAL RESOURCES & CONSERVATION

Box 424
Drummond, mt. 59832
February 06, 1989

John Tubbs
DNRC Water Resources Division
1520 East 6th Ave.
Helena, mt. 59620

MR. Tubbs:

We are Registering an objection to the filing of a water Reservation on Flint Creek by the Dept. of Fish, Wildlife and Parks, based on 3 Facts:

(1) it is excessive — They are asking for more water than the stream flows during low water time in the Summer, and, also, this amount is Several times more than any PRivate user owns, and, for that matter, more water than several of the largest Ranches, combined, own.

(2) it is based on incomplete and incorrect information, hastily compiled. there are serious questions concerning measuring points (was it Southern Cross or was it below Georgetown Dam, for example). they make no allowance for the approximately 3000 inches of water that Flint Creek CARRIES for the Flint Creek water users but which comes from the East Fork Dam on Rock Creek and is not, in fact, Flint Creek water.

116. There are two stream gauges on Reach 1 of Flint Creek. DFWP's request of 50 cfs is more than the median flows recorded below Georgetown Lake (near Southern Cross) and less than the median flows recorded near Maxville as shown in figures B-13 and B-15 of the draft EIS (see the response to comment 269). For a discussion of flows on Flint Creek, see the responses to comments 119 and 124.

The amount of water requested, for either a reservation or a permit, is based on the applicant's need and ability to put the water to beneficial use. Some water users need more water than others. A large hydropower producer, for instance, may hold rights to nearly all the flow in a stream. DFWP's requests are based on the amount of flow needed to cover a stream riffle. This methodology is explained in Appendix A of the draft EIS.

117. DNRC used the correct stream gauge in its analysis. The gauge in question is operated by the U.S. Geological Survey (USGS) and is located about 2 miles downstream of Georgetown Lake on Flint Creek. The USGS uses the name of the nearest town to describe the location of stream gauges. In this case, Southern Cross is the nearest town. Figure B-13 on page 123 of the draft EIS is labeled correctly and accurately reflects the location of the gauge.

118. See the response to comment 125.

Furthermore,
had they done any kind of accurate measuring
on lower Flint Creek (Reach 2), they could never
justify the flow Rate that they claimed. we
have Ranchers on the lower end of Flint Creek
119 since the early 1950's and the flow Rate they Claim
is just not there most of the time - certainly not
in the Summer months.

(3) it is untimely. Flint Creek is due for final
adjudication soon and we believe the FWP should
have waited until the water Court finished before
claiming any "excess" Flint Creek water. In
120 view of the fact that "excess water" is non-
existant in the Summer time, we believe that this
application is PRIMARILY an attempt to establish
a legal Prescence on Flint Creek Rather than
to obtain an actual water Right, so that they
can object to any and all future diversion Plans.

If you believe that you must grant FWP a water
Reservation, consider doing so by greatly Reducing their
Request to none on Boulder Creek and 10 CFS on
121 each Reach of Flint Creek, to be valid only during
the monts of November through March. the valley
water users need the April high water and the October
late water to Recharge the aquifer and guarantee
a good Return flow during IRRigation Season.

Please take these objections and suggestions
under serious advisement.

Very Sincerely,
Gene and Florence Allen

Gene and Florence Allen

119. Table 3-2 (see the streamflow section in Chapter Three of this final EIS) provides a record of flow measurements taken in Flint Creek near New Chicago. Because this is an ungauged reach, flow records are limited. Between 1974 and 1989, the rate of flow was measured on 43 separate days. These measurements indicate that DFWP's request of 45 cfs was present on all but eight of the days measurements were made. DNRC acknowledges that such a limited data base cannot provide definitive estimates of the frequencies of certain flows.

State law requires the applicant to show only that the requested flow does occur, though it may occur infrequently. An applicant can request any amount of water, even though the requested amount may not be present in the stream at all times. The Board may choose to grant less water than requested.

120. See the response to comment 201 for a discussion of the adjudication process.

If the Board grants DFWP's requested reservations on Flint Creek, DFWP would gain legal standing to object to future diversion proposals. DFWP would be required to follow the same objection process as any other water right holder. For its objection to be upheld, DFWP would have to show that its reservations would be adversely affected.

121. Your recommendation is noted. By its inclusion in this final EIS, your recommendation will be part of the legal record presented to the Board. Granting DFWP's requested reservation would not directly alter stream flows. If aquifers are recharged now by high spring flows and legal diversionary uses, they would continue to be recharged. Under Montana law, DFWP's requested reservations cannot be granted if the record of the contested case hearing shows that the use of senior water rights would be adversely affected. Therefore, even at DFWP's requested flows, the reservations would not affect the way in which existing water rights in the Flint Creek drainage influence aquifer recharge and return flows.

RECEIVED
FEB 10 1989
MONT. DEPT. of NATURAL RESOURCES & CONSERVATION

P. O. Box 94
Philipsburg, Montana 59858

February 6, 1989

Mr. John Tubbs
Water Resource Division
1520 East 6th Ave.
Helena, Montana 59620-2301

Dear Mr. Tubbs:

Water Reservation on Flint Creek
Granite County, Montana

This letter is to express our concern regarding the request by the Department of Fish, Wildlife and Parks for a water reservation on Flint Creek, Granite County, Montana.

122 We have reviewed the Environmental Impact Statement compiled by the Department of Natural Resources and Conservation and feel the document is in error in many instances. We feel the data presented was hastily gathered and of little value in determining conditions in the Flint Creek Valley Basin as they have existed for the past 52 years.

123 Not only does the E.I.S. fail to present comprehensive reasons for the Department being granted a water reservation but completely overlooks or chooses to ignore a number of issues that we feel must be considered before any action can be taken on their request.

122. Hydrologic data were presented in the draft EIS for two locations on Flint Creek—at Maxville and below Georgetown Lake (near Southern Cross). The data accurately reflect the amount of water actually flowing in Flint Creek at these locations. Data have been collected by the United States Geological Survey (USGS) at these stations. There is a 49-year period of record for the gauge at Maxville and a 50-year period of record for the gauge below Georgetown Lake. DNRC is not aware of additional continuous gauging records available for the upper reach of Flint Creek (above Maxville).

No continuous gauging records exist on Flint Creek below the USGS recording gauge at Maxville and only a few instantaneous measurements have been made (see the table in the streamflow section of Chapter Three in this final EIS). DNRC hydrologists estimated the flows of Flint Creek near its mouth using a computer model. The methods used to estimate flows for the model are described briefly on page 115 of the draft EIS. The flow estimates are found on pages 123 and 138 of the draft EIS, and in the revised tables as presented in Chapter Three of this final EIS. The tables were revised to reflect minor corrections in estimates of median flows. See also the responses to comments 195, 267, and 268.

123. Chapter Six of the draft EIS presents several reasons for granting DFWP its requested reservations. A reservation is the only way DFWP can obtain a water right and thereby preserve opportunities for recreation, waste dilution, and fisheries.

124 We, as water users, cannot see any reason for granting a water reservation to the D.F.W.P. as there is more water appropriated from Flint Creek and its tributaries than has ever flowed in the stream.

125 Another concern of the water users is the fact that for a portion of the year Flint Creek is used for transporting and distributing water from sources other than the natural flow of the stream. Granting the D.F.W.P. a reservation and the right to participate in water matters in the Basin can only lead to

126 disruption and litigation in a system that not only serves the water users very well but provides some of the finest fishing, waterfowl habitat and big game hunting to be found anywhere in America.

124. Flint Creek and its tributaries are highly appropriated during the irrigation season. The volume of water claimed and permitted in this basin is approximately 558,800 af/year (319,918 af/year above Maxville and 238,890 af/year below Maxville). While flows do decline during the irrigation season, even in dry years recorded flows at Maxville exceed DFWP's 50 cfs request in all but the winter months (see Appendix B in the draft EIS). There is no permanent gauge below Maxville, but the limited gauging records that are available suggest that water does flow in Flint Creek year-round (see Table 3-2 in the streamflow section of Chapter Three in this final EIS.

A substantial amount of water is already appropriated, but further appropriations may be possible because not all appropriations are used at the same time, and return flows can be reused downstream. The Flint Creek basin is open for further appropriation, and unless the basin is closed, DNRC is obligated by law to process permit applications. DNRC has issued 15 permits since 1973 in the Flint Creek basin for approximately 19,904 af/year. Of course, existing water right holders who feel that their water use may be adversely affected can object to new permits and to the proposed reservations.

If granted, DFWP's reservations would have a water right junior to all existing water rights. Under Montana law, DFWP's requested reservations cannot be granted if the record of the contested case hearing shows that the use of senior water rights would be adversely affected.

125. Flows measured at Maxville include some water diverted from the East Fork reservoir located in the Rock Creek drainage west of the Flint Creek drainage. Water can be stored and/or diverted from another drainage and turned into a natural channel for withdrawal or diversion and beneficial use downstream. That water is not considered part of the natural flow of the stream (§ 85-2-414, MCA). Therefore, DFWP's reservation could not impede the transport or withdrawal of that water under a valid existing right.

126. The instream flow reservations would be junior to existing water rights. Under Montana law, DFWP's requested reservations cannot be granted if the record of the contested case hearing shows that the use of senior water rights would be adversely affected. This would include existing uses of agricultural water rights, and—indirectly—the incidental benefit to fish and wildlife resulting from exercising those rights.

Mr. Tubbs -2- Feb. 6, 1989

Granting a water reservation to the D.F.W.P. would, in all probability, stop any further development of any kind in the
127 Basin and beyond a doubt would foster a feeling of resentment from irrigators that could lead to the closing of part, if not all, of Flint Creek to fishing and much of the adjoining lands to big game hunting.

We object to granting a water reservation to the D.F.W.P. and giving the Department the right to request a water commissioner.
128 Such an action would not only disrupt an irrigation system that has been fine tuned over a period of 120 years but could seriously affect the tax base of our country as some of the land being taxed as irrigated ground depends entirely on what the D.N.R.C. likes to call waste water resulting from inefficient irrigation. Further, if during a period of drought,
129 the irrigators were, for any reason, denied access to available water, they should be granted some tax relief and the agency responsible should be required to compensate the County for any lost revenue.

127. Although DFWP's reservations could limit consumptive water development in the upper basin, they would not preclude development altogether. Water might be available in some streams or reaches (particularly in the lower reaches of the basin) and not in others. If viable storage sites can be found, high spring flows could be stored for irrigation or other uses. Industrial water developers and other users may be able to purchase water from existing right holders, and municipalities have the authority to condemn existing water rights in order to expand domestic water services. In most states with fully appropriated basins, water rights are bought and sold like any other marketable property.

128. DFWP could not petition for the appointment of a water commissioner under present decrees. Under Section 85-5-101(1), MCA, the district court may appoint a water commissioner "upon the application of at least 15 percent of the water rights affected by the decree." Since any water reservation awarded to DFWP would not be included in the existing decrees, DFWP would not have a right affected by the decree and therefore could not petition. Even though DFWP cannot request appointment of a water commissioner without being included in a decree, if a commissioner is appointed by petition from other water users, DFWP would probably be required to help pay for the commissioner if its water reservation right is distributed by the commissioner.

After an enforceable decree is entered by the Water Court under the ongoing adjudication process, a water commissioner may be appointed by the district court upon application by DNRC and one or more water right holder(s), which would include water reservants. Once appointed, the water commissioner will distribute water to all appropriators according to their rights and priorities, including water reservants.

129. An instream flow reservation would not affect the tax classification of any land currently classified as irrigated land. A reservation could restrict expansion of irrigated land or improvement of existing irrigated land. An instream reservation also would not limit any senior right holder's access to water, even during a drought. The classification of irrigated hay land is determined by land productivity and water costs. Depending on water costs, new irrigation improvements may or may not increase the taxable value of the land.

Granting the D.F.W.P. a water reservation would create another layer of bureaucracy with which to contend and could conceivably lead to the dewatering of the basin with disastrous consequences on agriculture as well as fish and other acquatic animals that depend on stream flow at times other than irrigating season. 130

Another contention by the D.N.R.C. that has the water users disturbed is the grossly exaggerated claims relative to the dollar values attributed to fishing and recreation in the Flint Creek Basin. Any two or three medium sized ranches in Granite County contribute more to our Schools, roads and County Government than the combined recreation facilities in the entire County. 131

Lastly, if the track record of the D.N.R.C. and the D.F.W.P. in matters pertaining to water is any indication of what we can expect in the future we feel that we would be in deeper trouble than we have been in in the past and are at the present time. We hope the Board will deny this request, or at least delay any decisions until the Water Adjudication process is completed and some meaningful data is compiled. 132

Respectfully submitted,

Flint Creek Water Users

Rt. Rcpt.

UPPER FLINT CREEK VALLEY WATER USERS

130. Granting DFWP's requested reservations would add one additional water user to the basin. DFWP, like any other water right holder, would then have the right to object to the issuance of new water use permits and to changes in existing water uses. If DFWP's objections are upheld, it would limit additional consumptive uses and would maintain existing stream flow patterns. Therefore, the existing aquatic habitat and, incidentally, the availability of flows for existing irrigation rights would be preserved. On the other hand, from the perspective of the water developer, granting DFWP's requested reservations means that there could be little water available for future appropriations. However, if water shortages become more frequent or severe, existing water rights may themselves eventually limit new consumptive appropriations. Continued water development may have to rely on buying and selling existing water rights or storing high spring flows.

131. The draft EIS contained no estimates of the economic values of fishing and recreation in the Flint Creek basin. No such estimates existed when the draft EIS was written, and DNRC is not aware of any produced since that time. DNRC did reference a study estimating the value of recreation in the entire upper Clark Fork basin on page 74 of the draft EIS. For estimates of angler-use, see Table 2-6 in Chapter Two of this final EIS.

132. Your recommendation is noted. By its inclusion in this final EIS, your recommendation will be part of the legal record presented to the Board.

Montana Department of Fish, Wildlife & Parks

1420 East Sixth Avenue
Helena, Montana 59620
February 9, 1989

John Tubbs
re: Clark Fork Reservations
Department of Natural Resources
and Conservation
Water Resources Division
1520 E. 6th Ave.
Helena, MT 59620

Dear John:

Enclosed are our comments on the upper Clark Fork Basin Water Reservations DEIS. If you have any questions, please contact me.

Sincerely,

Liter Spence
Water Resources Supervisor
Fisheries Division

drg
Enclosure

UPPER CLARK FORK BASIN WATER
RESERVATIONS DRAFT EIS
DFWP COMMENTS

General Comments

133 A concern we have with this reservation process, and which is only incidentally addressed in the DEIS, is the water availability situation in the streams we applied for. There is some data in the mainstem Clark Fork, but nothing on the tributaries. Because of the Yellowstone reservation experience, where water availability data was also lacking, it is already apparent that the Board will want to know if water is available to meet the reservation requests. The DEIS uses the mainstem water availability data to discuss the effects the instream reservations would have on future consumptive uses but does not discuss what quantity of unappropriated water is available now for instream reservations which could be granted by the Board. We encourage DNRC to develop such data as quickly as possible.

133. Additional information on physical water availability in the upper Clark Fork basin is presented in Chapter Three of this final EIS. Physical water availability on Clark Fork and tributary streams was discussed on pages 14, 15, and pages 115 through 141 of the draft EIS.

Under the prior appropriation doctrine, the senior appropriator has first right to the water, but when water is not being put to use it must be returned to the stream for use by junior appropriators. In this system, water is used at different times by different appropriators. In addition, return flows from upstream uses augment the water available for reuse downstream. Consequently, when diversions from all the water rights on a particular stream are added together, they may total more than 100 percent of the flow of the stream, and yet water may still be available for additional beneficial uses. If water is physically in the stream, and can be used without adversely affecting a senior downstream water right, then that water is legally available. DFWP's reservations would be junior to existing water rights, and therefore could not, by law, be granted or put to use if the record of the contested case hearing shows that existing rights would be adversely affected.

It should also be clearly discussed in a summary statement that GCD's and DFWP's applications have very minor conflicts (only in March and April and for a temporary period of time). See page 59 of the DEIS as an example.

134 We also need to summarize the difference in impacts between granting the high and low inflection point flows. What is the difference in water available for new depletions if these reservations are granted. The DEIS has such discussions but they are 15 pages apart in the document. The public and the Board would probably like an overview of what effects granting reservations at the high and low inflection points will be.

It was our observation while reading the EIS that the message is often there, but requires very careful reading to see it.

135 We also notice that although an analysis was made of impacts of denying the FWP requests, no such analysis for denying the GCD request was provided.

Specific Comments

Page	Comment
ii	Column 1, Paragraph 1, Lines 8 & 9
136	We don't necessarily agree with the conclusion. "Indefinitely" is a long time. A lot of water could be depleted from the basin to the detriment of the fishery before anything was done to eliminate those depletions. Nothing to date has prevented new permits from being issued. Hydropower has to date not objected to new permits - will they in the future?
2	Column 1, Last full paragraph; Column 2, 2nd full paragraph
137	Existing rights are protected by law. Do these statements refer to determining effects on existing rights only for the GCD storage project?

134. The summary in Chapter Two of this final EIS includes a review of the conflicts in DFWP's and GCD's requests. Granting DFWP's reservations at the lower inflection points would leave more water in the streams, which could be appropriated for future consumptive use, but would afford less protection to instream values. See the revised Table 5-5 reprinted as part of Table 2-9 in Chapter 2 of this final EIS.

135. If the Board denies GCD's application for a water reservation, water that would otherwise be reserved would be available for appropriation by others. Until new appropriations occur, flows in the North Fork of Lower Willow Creek would continue as they are. Water levels in the existing lower Willow Creek Reservoir would continue to fluctuate and drawdowns would continue to occur. The existing irrigation project would continue to experience water shortages as it now does.

Downstream water rights would not be affected if GCD's request is denied. Water quality, fisheries, and wildlife resources would remain in their present state. No new or improved recreational opportunities would be created. Use of land at the reservoir site would continue. Short-term increases in employment due to project construction would not occur. Any benefits or costs to the local economy, and local tax base, or increases in agricultural production, would be forgone.

136. If DFWP's reservation requests are denied, DNRC would probably continue to issue new consumptive-use permits in the upper basin and further depletions would occur. Flows could possibly be reduced to the point of harming the fisheries and other instream resources. However, the upper Clark Fork is a highly appropriated basin. By law, DNRC is oblgated to respond to requests for permits, and senior water rights must rely on the established objection and contested case hearing process or petition to close the basin to protect their rights. It is likely that persons (or entities) claiming senior water rights will eventually start objecting to the issuance of new permits. However, these objections may not be upheld or may not occur in time to protect the instream resources of concern to DFWP. See also the response to comment 208.

137. No. The paragraphs in question apply equally to DFWP and GCD, except where instream flow reservations are mentioned exclusively.

10 Column 2, #2

138 Flint Creek would be affected only in the 3 -4 miles below the mouth of Lower Willow Creek before it enters the Clark Fork. This statement implies too large an impact on water availability for the GCD project.

11 Column 1, #2

139 Exchanging hydropower rights at Noxon, etc., with Hungry Horse water was determined infeasible in a recent BuRec/DNRC contract study.

Column 1, #3

140 Clarify next to last sentence. How does this relate to the Idaho case?

138. Chapter Two of the draft EIS presents a summary of both DFWP's and GCD's applications. The sentence in question restates one of the reasons included in GCD's application describing why the water reservation on the North Fork of Lower Willow Creek is needed. The sentence reads, "DFWP is seeking reservations on Flint Creek that, if granted, would not leave enough water available for the proposed project." Based on DNRC's water availability analysis, there would be a conflict between the two reservations in the months of March and April. As reported on page 59 of the draft EIS, in no stream other than Flint Creek below the mouth of Lower Willow Creek are the estimated depletions associated with GCD's proposed project "significant enough to conflict with DFWP's requested reservations." If DFWP's request in the lower reach of Flint Creek is granted first, it would make GCD's proposal even less feasible.

139. At the time the GCD application was prepared and submitted to DNRC, the Bureau of Reclamation study had not been conducted. Furthermore, GCD proposed exchanges of water out of Hungry Horse Reservoir as only one of four possible strategies to overcome the constraints to water availability that the downstream water hydropower rights might impose (see pages 57-58 of the draft EIS for a full discussion of these strategies). The 1988 Bureau of Reclamation study (USDI 1988) stated the bureau's concern that an exchange could adversely affect power generation, instream flows, and increase reservoir fluctuation, but did not state that such an exchange was infeasible. The bureau's study was based on a large exchange of water to develop 120,000 acres of new irrigation in the upper basin, of which 37,200 acres would be in the basin above Milltown Dam. GCD's proposed project on the North Fork of Lower Willow Creek would provide supplemental water from storage to 2,900 acres in the Flint Creek valley.

140. In January 1988, FERC issued a decision granting a license to the Boise Cascade Corporation for a hydroelectric project at Horseshoe Bend on the Payette River. In this decision, FERC denied a request by the Idaho Department of Natural Resources to subordinate the project's water use to unlimited future uses upstream in accordance with Idaho state law. FERC argued that the comprehensive planning provision of section 10(a)1 of the Federal Power Act, 16 U.S.C. and 803(a)1, allows it to consider all aspects of the public interest, including environmental protection and the need for power produced at the project. FERC also found that subordinating the project to upstream uses would render the project financially infeasible. FERC noted, however, that the Federal Power Act also allows FERC to modify project operations to resolve future water use conflicts affecting the public interest. Accordingly, Article 12 of the Horseshoe Bend license allows FERC at any time to reasonably reduce the amount of water used for hydropower generation if an upstream use has greater public interest benefits when weighed against environmental impacts and power needs.

11 Column 2, Last paragraph

The proposed benefits of the GCD project to fisheries as presented by GCD are speculative. Fishery benefits will depend entirely on the final operation of the two reservoirs. Lower Willow Creek Reservoir will continue to be drawn down (even if not as rapidly as at present) and will still be depleted by the end of the irrigation season in many years. (DEIS, Table B-5). It remains to be seen if the reservoir fishery will be improved. Also, there is not data in the EIS to show streamflows will improve below the existing reservoir. Minimum flows at the mouth of Lower Willow Creek will not change except in June. Average flows will change only slightly, with the most change in April-June. There is no comparison of existing flows in N. Fk. Lower Willow Creek with releases from the proposed project on that stream.

141. Chapter Two of the draft EIS presents the applicants' explanations of why the reservations are needed and in the public interest (see page 5, column 1, paragraph 1 of the draft EIS). DNRC's analysis is presented in chapters Five, Six, and Seven of the draft EIS. Final operating plans would be needed to determine the specific impacts to the fishery.

142. In general, a reservoir will tend to stabilize flows so that spring flows are stored (thus reducing peak spring runoff) for later release (thus increasing normally low summer flows). The proposed North Fork of Willow Creek Reservoir would not be an exception to this rule. Table 4-4 summarizes releases from the existing reservoir of Willow Creek Reservoir. The proposed reservoir would diminish average releases during March, April, May, and June and increase releases during July, August, and September.

Table 4-4
Lower Willow Creek Reservoir Releases (cfs)
With and Without Proposed North Fork of Lower Willow Creek Project

Without Proposed Reservoir

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Average	5.0	5.0	5.0	5.0	5.0	6.4	20	106	79	70	14	7.2
80th %	5.0	5.0	5.0	5.0	5.0	5.0	5.0	73	51	58	4.2	5.2
60th %	5.0	5.0	5.0	5.0	5.0	5.0	5.0	89	51	76	11	6.2
50th %	5.0	5.0	5.0	5.0	5.0	5.0	5.0	98	52	79	12	6.4
40th %	5.0	5.0	5.0	5.0	5.0	5.0	13	110	68	80	13	7.1
20th %	5.0	5.0	5.0	5.0	5.0	5.0	35	150	110	81	19	9.4
Maximum	5.0	5.0	5.0	5.0	5.0	5.0	88	260	240	81	54	14
Minimum	3.1	5.0	5.0	5.0	5.0	5.0	5.0	25	40	4.9	2.8	2.5

With Proposed Reservoir

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Average	5.0	5.0	5.0	5.0	5.0	5.0	5.0	25	51	75	48	14
80th %	5.0	5.0	5.0	5.0	5.0	5.0	5.0	25	51	75	28	5.9
60th %	5.0	5.0	5.0	5.0	5.0	5.0	5.0	25	51	79	52	7.1
50th %	5.0	5.0	5.0	5.0	5.0	5.0	5.0	25	51	80	61	7.9
40th %	5.0	5.0	5.0	5.0	5.0	5.0	5.0	25	51	81	61	14
20th %	5.0	5.0	5.0	5.0	5.0	5.0	5.0	25	51	81	64	26
Maximum	5.0	5.0	5.0	5.0	5.0	5.0	5.0	25	51	81	69	30
Minimum	3.1	5.0	5.0	5.0	5.0	5.0	5.0	25	49	17	2.4	2.5

(response 142, continued)
Table 4-5 summarizes flow downstream of the proposed North Fork of Willow Creek Reservoir for conditions with and without the reservoir. The proposed reservoir would increase average flows during July and August while reducing average flows during the remainder of the year.

Table 4-5
Estimated Flows Below Proposed North Fork of Willow Creek Reservoir Site (cfs)
With and Without Proposed Reservoir

Without Proposed Reservoir

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Average	2.7	3.1	2.9	3.0	4.0	4.7	11.5	31	19	4.0	1.7	2.0
80th %	2.1	2.4	2.3	1.8	2.3	3.1	5.6	22	6.6	1.8	1.1	1.5
60th %	2.3	2.9	2.6	2.4	2.5	3.9	8.6	28	12	2.8	1.3	1.7
50th %	2.4	2.9	2.8	2.8	2.9	4.1	9.3	30	14	3.3	1.5	1.9
40th %	2.8	3.4	2.9	2.8	3.2	4.4	12	32	18	3.6	1.6	1.9
20th %	3.4	3.5	3.4	3.2	4.3	6.8	18	44	30	6.5	2.1	2.5
Maximum	4.9	6.2	6.4	14	18	9.8	28	71	65	13	4.6	3.7
Minimum	1.0	2.0	0.7	1.3	1.8	1.6	2.4	4.2	2.7	0.5	0.8	0.7

With Proposed Reservoir

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Average	2.1	2.4	2.0	2.1	2.0	2.0	2.1	3.9	13	36	19	18
80th %	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	24	1.0	1.3
60th %	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	9.4	38	2.6	1.5
50th %	2.0	2.2	2.0	2.0	2.0	2.0	2.0	2.0	12	42	9.6	1.7
40th %	2.1	2.5	2.0	2.0	2.0	2.0	2.0	2.0	18	44	16	1.8
20th %	2.4	2.9	2.0	2.0	2.0	2.0	2.0	2.0	22	46	41	2.4
Maximum	4.0	3.5	2.9	7.0	2.1	2.1	4.7	46	31.8	55	58	4.1
Minimum	0.8	2.0	0.7	1.3	2.0	2.0	2.0	2.0	2.0	1.0	0.7	0.5

15 Table 3-2

143 Are WWP rights at Noxon correct? Believed they were 35,000 and 15,000 cfs.

17 Figure 3-2

144 We assume "pending" rights are permits which have been applied for but not yet issued?

34 Column 1, Paragraph 2

145 Did flows get low enough in 1988 that Drummond and Phillipsburg violated water quality criteria?

143. The water right claims and permits listed for WWP's Noxon Rapids Dam are correct. WWP filed a claim for 35,000 cfs with a priority date of February 20, 1951. A subsequent decree by the water court found that an additional 5,400 cfs with a priority date of September 1, 1959 was implied in WWP's 1982 filing. Therefore, WWP's claimed rights total 40,400 cfs. WWP was also granted a water use permit with a priority date of November 19, 1974. WWP's permit specifies that the diversion cannot exceed 15,000 cfs or a total appropriation on the Clark Fork of 50,000 cfs (Permit number 4189-Sec. 76N). This maximum rate is based on turbine power production, which peaks at 50,000 cfs. A final determination of WWP's right will be made during the adjudication process.

144. Yes.

145. The wastewater treatment systems of Philipsburg and Drummond were operated in compliance with the stipulations of their discharge permits in 1988 (Shewman 1989).

35 Column 2, Paragraph 4.

146 Shorthead sculpin - what is source of statement they are widespread outside Montana? The statement somewhat implies they would be easy to replace if lost in Montana.

146. DFWP (1986) describes the Natural Heritage Program's ranking of the shorthead sculpin outside Montana as "demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery."

Lee and others (1980) describe the shorthead sculpin's distribution as "common in many streams of the lower Columbia and Snake river systems in Oregon and Idaho. Present in Boise, Salmon, and Clearwater systems of southeast Idaho. In a few tributaries of the Flathead and Little Blackfoot rivers in Montana and just into British Columbia in the Flathead." They also note the species is found intermittently in tributaries to Puget Sound.

Holton (1980) lists the shorthead sculpin as a Class B species of special concern. According to Holton, fish in the Class B designation have "limited numbers and/or limited habitats in Montana; fairly widespread and fair numbers in North America as a whole; elimination from Montana would be at least a moderate loss to the gene pool of the species or subspecies. He goes on to say, "the shorthead sculpin is confined to the Columbia River and Puget Sound basins. Montana specimens recorded to date are from the upper Flathead drainage and the St. Regis and Little Blackfoot rivers." Graham and others (1986) noted that the shorthead sculpin had been downgraded to a Class C species of special concern and list it as a species with limited numbers and/or limited habitats in Montana, but widespread and numerous in North America as a whole. Accordingly, "elimination from Montana would be only a minor loss to the gene pool of the species" (Graham and others 1986).

The statement in the draft EIS is intended to describe the distribution of the species. It is not intended to imply anything about ease of replacement should the species be eliminated from a portion of its range.

45 Column 1, 1st full paragraph

147 Might be worthwhile to state why Deerlodge and Silverbow counties have lost population while Powell and Granite counties have not. Mining Shutdown was big factor.

147. Reductions in mining and smelting employment appear to have contributed to substantial out-migration from Silver Bow and Deer Lodge counties in the 1980s. Powell and Granite counties also may have been impacted by industrial and mining closures, though the effects on local economies and local populations appear to have been less dramatic.

Since the draft EIS was prepared, the U.S. Bureau of the Census has published population estimates for 1988 (see Table 4-6). The estimates predict that net out-migration has been occurring in all of the upper basin counties. Out-migration has been most notable in Silver Bow and Deer Lodge counties.

Table 4.6
Estimates of Population Trends Upper Clark Fork Basin Counties 1980 to 1987*

	Population 1980	Population 1988	Population Change 1980-1988	Net Migration 1980-1988
Deer Lodge	12,518	10,000	-2,500 (-20.2%)	-2,400 (-19.4%)
Granite	2,700	2,600	0 (0.0%)	-100 (-4.2%)
Missoula	76,016	78,300	+2,300 (+3.1%)	-3,300 (-4.4%)
Powell	6,958	6,800	-200 (-1.0%)	-300 (-4.0%)
Silver Bow	38,092	33,200	-4,900 (-11.7%)	-4,700 (-12.3%)
Totals:	136,284	130,900	-5,400 (- 4.0%)	-10,800 (- 7.9%)

* 1988 populations are estimates prepared by the U.S. Bureau of the Census.

Source: U.S. Department of Commerce. 1989.

47 Column 1, 2nd paragraph

148 In the preceding paragraph, some actual percentages are given for agriculture. Are there some percentages for urban and individual tax contributions which can be used for comparison?

49-56 Improved irrigation efficiency could also be discussed
149 as a means to reduce impacts of DFWP's reservation on future water uses.

49 Column 2, Paragraph 3.

150 The possibility of purchase or lease of existing rights should be discussed, since that would produce less of a constraint on future development.

148. Residential property is 48.4 percent of the tax base in Deer Lodge County, 18.3 percent in Granite County, 40.4 percent in Missoula County, 20.5 percent in Powell County, and 37.6 percent in Silver Bow County. Commercial and industrial property combined are 15.2 percent of the tax base in Deer Lodge County, 3.3 percent in Granite County, 22.0 percent in Missoula County, 6.2 percent in Powell County, and 22.8 percent in Silver Bow County. The other large components of the tax base are mining and manufacturing equipment and utilities and co-ops. Mining and manufacturing equipment is 10.6 percent of the five-county tax base, with 96 percent of that being located in Missoula and Silver Bow counties. Utility and co-op facilities are 15.7 percent of the five-county tax base, with 70 percent of this property found in Missoula and Silver Bow counties. However, this class of property makes up 35.1 percent of the tax base in Powell County and 38.3 percent of the tax base in Granite County (Montana Department of Revenue 1988).

In fiscal year 1988, agricultural property represented about 17 percent of the total taxable value of Granite County and about 20 percent of the taxable value of Powell County. Agriculture was less important to the overall tax bases of Deer Lodge (6 percent), Missoula (2 percent), and Silver Bow (1 percent) counties.

149. Improved irrigation efficiency could result in increased development while maintaining current levels of water demand. In general, an increase in irrigation efficiency would reduce the amount of water diverted, but would also reduce return flows during the following months. The net annual result would be an increase in flows. Existing water right holders might use the increased flow for additional irrigation. If the water is not used by existing right holders, new water development might be possible.

In 1978, the SCS predicted that irrigation efficiency in the upper Columbia River basin (which includes all of Montana west of the Continental Divide) might improve to 34 percent by the year 2000 (USDA 1978). It is unknown whether this prediction can still be met.

150. Prospective water users could purchase or lease water from existing water right holders if willing sellers or lessors were available. Leasing is currently limited to the pilot program approved by the 1989 Legislature, under which water can be leased only for instream flows (see the response to comments 210-211 and the brief description of the leasing program in Chapter Three of this final EIS).

50 Column 1, 1st paragraph

151 First and second lines would be more clear if the word "already" were inserted between "might" and "limit".

50 Column 1, Last paragraph and Column 2 First 2 lines

152 It should also be pointed out that DFWP would not be the only third party who could limit water right changes. Any existing user could do that if they wanted to.

50 Column 2, First half of paragraph

153 It should be mentioned that very little new hydro has been developed to date in the Upper Clark Fork, even though the avoided costs have been higher than they are now. Thus the impacts may not be as great as indicated in this paragraph.

50 Column 2, Last half of paragraph

154 DFWP would not be the only possible limiting factor in new hydropower proposals. FERC, itself, can impose restrictions to new development even without an instream reservation.

51 Table 5-2. Footnote (b)

155 Should the number 300 cfs be 330 cfs to coincide with numbers in the table?

Column 2, Paragraph 1

156 Winter flow requests would only apply until reclamation reduces metals concentrations in the Clark Fork so all the tributary dilution water is not required. Although we do not know when this will occur, it is nevertheless a temporary situation.

Column 2, Last half paragraph 2

157 Should also point out that there aren't that many acres of new land that can be feasibly irrigated in the upper basin.

151. The paragraph has been amended to read:

> In the description of impacts under Case 1, we assume that the holders of existing water rights would assert and enforce their rights, even though some of them have not yet done so. The upper Clark Fork is already heavily appropriated. If existing water right holders object to new appropriations and these objections are upheld, little or no water would be available for new permits or reservations. In Case 1, future water development could be constrained by existing right holders whether DFWP had instream reservations or not, and granting DFWP's requested reservations would not further constrain water development.

152. As stated on page 50 of the draft EIS, "...legal notice is given to all water right holders. These water right holders, including DFWP, could have standing to object even if they hold a water right that is junior...."

153. Hydropower was used here as an example of a nonconsumptive use that could adversely affect DFWP's requested reservation. The likelihood of such development was not addressed, and the text does not indicate any magnitude of the impact.

154. Comment noted. If DFWP's reservation requests are granted, the agency would gain legal standing to object to new water use applications. Thus, DFWP would be an additional, potential impediment to water development. In the past, DFWP has participated in the FERC relicensing process and proposed operational constraints at hydropower facilities to protect fish and wildlife resources.

155. Yes. In footnote b, 300 cfs should read 330 cfs.

156. Comment noted. Also see the responses to comments 78 and 49.

157. As discussed on pages 69 through 72 of the draft EIS, there are an estimated 8,362 acres of undeveloped irrigable land in the upper Clark Fork basin.

52 Column 1, Paragraphs 2 & 3

These statements tend to belittle the value of instream flow through Missoula. They also don't consider future consumptive use in the Blackfoot drainage which could reduce flows through Missoula, especially if DFWP's Murphy rights are somehow changed during the adjudication process. If that should occur, the Clark Fork instream flows would be even more important. Also our Murphy Rights do not control all the unappropriated water in the Blackfoot drainage. 158

There is probably little chance a major water use will further deplete the Clark Fork in the ±5 miles between Milltown and Missoula.

54 Column 1, Paragraph 4

159 Same comment as that for Page 52.

Column 2, Paragraph 1

160 This entire paragraph is unclear and should be rewritten. Also define "increased stability".

158. DFWP's request, if granted, would only directly protect flows in the upper Clark Fork basin, above Milltown. Flows below Milltown would not be legally protected. Flows from the upper basin currently contribute about 50 percent of the average annual flow in the Clark Fork at Missoula. Further depletions in the Blackfoot basin would reduce flows at Missoula and as a result the contribution of flows from the upper Clark Fork basin would comprise a larger percentage of the reduced total flow. See the discussion on the legal and practical implications of DFWP's requested reservations in Chapter Three of this final EIS.

159. See the response to comment 158.

160. DFWP's requested reservations would not affect the basin's economy as profoundly as other factors. By limiting further depletions, the reservations would benefit existing industrial and municipal waste dischargers, downstream hydropower producers, and water-related recreation businesses. The discussion of local economic impacts on page 54 of the draft EIS refers to this situation as "increased stability." See also the response to comment 264. In the upper basin, businesses related to fishing and boating would benefit from the maintenance of existing flows. Existing irrigated agriculture would also experience some limited, indirect benefits (see the response to comment 76).

On the other hand, DFWP's requested reservations could limit the development of new consumptive water uses and related economic activities. Development of the estimated 8,362 acres of undeveloped irrigable land remaining in the upper basin could be curtailed, thus limiting the expansion of some local ranches and, in turn, farm supply businesses in the upper basin. The instream reservations could also limit the growth of other industries that typically divert water; however, no new industrial water uses have been proposed in the upper basin. See also the response to comment 127.

55 Column 2, Paragraph 1, 2nd Sentence.

161 Tom Power recently had an editorial on the radio concerning this aspect of out-migration. He might disagree with this statement. He says many folks tend to stay in Montana regardless of economic downturn.

61 Column 1, Paragraphs 1 & 2

162 Need to better explain why, in low flow years, flows will not change as they will in higher flow years.

64 Column 2, Paragraph 3, Line 10

163 The quotation is in error. The word "poor" should be inserted between "a" and "sport". Also the first sentence of the quotation has been omitted which alters the overall meaning of the statement.

161. Employment and income characteristics have an important influence on overall migration patterns to and from Montana. During the 1970s, Montana experienced a period of fairly rapid economic growth and net in-migration of people (more people moved into the state than moved out). In the 1980s, the creation of new jobs and income growth in Montana lagged, and the state has experienced net out-migration of people (more people have moved out of Montana than have moved in).

Dr. Tom Power of the University of Montana observes that in the early 1980s, Montana lost approximately 15,000 high-paying wage and salary jobs in extractive industries. Many people affected by the job layoffs have tried to stay in Montana by creating self-employment jobs. Dr. Power estimates that Montanans created an additional 25,000 self-employment jobs in that decade. Most of these are lower paying jobs in retail and service.

Dr. Power believes that people who have created their own niche as described above would try to stay in Montana during a temporary economic downturn. If unfavorable employment and income conditions persist, some of these people would leave the state in search of better opportunities (Power 1990).

162. During dry years, when runoff is relatively low, all or most of the runoff is appropriated by existing water users. If these existing users call for their water, little if any water would be available for storage in GCD's proposed reservoir on the North Fork of Lower Willow Creek. By contrast, during the years of relatively high flows, more water could be stored in the proposed reservoir, and the reservoir would exert greater influence on downstream flows. Therefore, changes in flows downstream of the proposed reservoir would be more dramatic during high flow years.

163. The paragraph has been corrected to read:

> Under this case, some flows would be available for appropriation for consumptive use if DFWP's requested reservations were granted based on the lower inflection point. Such reservations would not protect existing flows but would provide a lower, though less desirable, level of protection according to DFWP (1989). The lower flow regime would "...provide for only a low population of the species present. In the case of game fish species, a poor sport fishery could still be provided" (DFWP 1986).

Also, in line 6 the word "minimum" should be changed to "less desireable" or some other wording.

164 Some folks already view instream flows as "minimum" flows and the use of the word here may imply that the lower inflection point flow is adequate.

65 Table 5-5

Storm Lake Creek. 3 cfs is used without the explanation we supplied in our application (page 66-67).

Little Blackfoot River. 110 cfs was high inflection point but we requested only 85 cfs.

165 Flint Creek Reach 2. 60 cfs was high inflection point but we requested only 45 cfs.

Harvey Creek. 5 cfs was high inflection point but we requested only 3 cfs.

Column 1, Paragraph 1, Line 12

103 cfs should read 100.3 cfs - see Table 5-6.

66 Columns 1 & 2, All paragraphs

166 More explanation is needed as to why only the river below Gold Creek is discussed here. How will the rest of the river be affected?

67 Column 2, Last paragraph

167 Murphy Rights are not "historic" flow levels in themselves. They are only a part of the historic (depleted) flow.

68 Column 1, 3rd & 4th paragraphs under Economic Impacts

168 Substitute the word "reduction" for "changes in flows" for clarity. Also, what is the purpose of speculating on the impacts of "slight changes" or "small depletions" if the larger inflection point flow is granted? Perhaps larger consumptive uses will use up the water left if the lower inflection point flow is granted.

69 Column 1, 1st Complete paragraph

169 Why wouldn't converting from flood to sprinkler irrigation save at least some water? The paragraph concludes too quickly without a good explanation for the conclusion.

164. See the response to comment 163.

165. A corrected Table 5-5 is reprinted in Chapter Two of this final EIS. All of the errors noted in this comment have been corrected. Further, the text on page 65, column 1 of the draft EIS should read: "At various points on the Clark Fork between Drummond and Rock Creek, 20.6 to 100.3 cfs would be available for consumptive use in 8 out of 10 years during August, the most limiting month."

166. As indicated in Table 5-6 of the draft EIS, there would be no flows available in excess of DFWP's request at points above Gold Creek in August. Thus, there would be no water available for future full-service irrigation. The results of diversions for purposes other than irrigation would be similar to those discussed for the river below Gold Creek.

167. Comment noted. Murphy rights constitute only a portion of historical water use and therefore would assure that only a portion of the flows in the Blackfoot River would be contributed to the Clark Fork.

168. The changes in flow would be net annual reductions in flow.

The purpose of this paragraph in the draft EIS was to address impacts resulting from granting a water reservation for less than requested by DFWP.

DFWP's instream flow right would only constrain development which would adversely affect the flows granted to the agency. Table 5-6, on page 66 of the draft EIS, presents the amount of flow in excess of DFWP's lower inflection point at six points along the Clark Fork main stem. DFWP may not be the only constraint to future development. Eventually, existing water rights may prevent additional water rights from being issued (see responses to comments 127 and 136).

169. Conversion from flood irrigation to sprinkler irrigation is one common method of improving irrigation efficiency. GCD's application assumed that existing flood irrigation would be converted to sprinkler irrigation before or during operation of the proposed reservoir on the North Fork Lower Willow Creek. Some water would be saved by this conversion, but a water shortage would still exist and there would still be a need for additional storage to meet water demands on the sprinkler irrigated lands.

71 Column 2, Paragraph 2, 2nd sentence

The sentence seems awkward - "no additional protection." Denying DFWP's reservations would mean no protection from the Clark Fork above Rock Creek would be available. Also, remember the Murphy Rights do not nearly tie up all the flow in either the Blackfoot or Rock Creek. New uses could deplete the unappropriated water and reduce the flows through Missoula. Therefore, flows in the Clark Fork above Rock Creek are important to Missoula and downstream municipal and industrial users.

170

74 Column 1, Paragraph 1, Last sentence

"Costs" should be defined. Are these direct or indirect costs? DFWP's direct costs will be the same, but the costs to others (indirect costs) may be higher. However, it may also be that cleaning up the river could provide recreational benefits at least equal to the benefits of mining or industrial development.

171

75 Column 1, Last part of paragraph at top of page

172 A source should be stated for "...at most a few million dollars". The sentence tends to belittle boating.

Column 2, 1st Paragraph under Costs

173 The last sentence is unclear and needs some explanation as to how it fits into the rest of the paragraph.

76 Column 2, Last part of paragraph at top of Page

174 "... costs of up to the tens of millions of dollars ..." Should cite a source for such big money to miners.

170. See the response to comment 158. See Chapter Three for a discussion of the effect of DFWP's requested reservations on flows below Milltown Dam.

171. All benefits and costs discussed in the text would accrue to parties other than DFWP. DFWP's cost of administering the reservation would be small relative to other benefits and costs and were not discussed. See the response to comment 269, specifically the table included there.

172. See the response to comment 93.

173. The sentence in question refers to the limited costs DFWP's reservations would impose if existing water rights constrained additional appropriations. This scenario is explained more fully in the second full paragraph on page 76 of the draft EIS.

174. As with other magnitudes that could not be accurately quantified because of limited information and uncertainty about the future, DNRC attempted to place an upper bound on the cost that DFWP's reservations could impose on future mining.

The proposed mine in German Gulch, a tributary of Silver Bow Creek, has a permit to divert up to 512 af per year. Based on comparisons of the prices of irrigated and non-irrigated land in Montana (the difference being the value of the water right), a mining venture should be able to buy existing irrigation water rights for less than $1,000 per af. Thus, a mine with water demands similar to the German Gulch mine could buy existing water rights to meet its demands for less than $1 million. Ten similar mines, if a mining boom occurred, would put the cost at less than $10 million.

77 Column 2, Paragraph 2

The first sentence should be qualified to reflect the degree to which recreational use of the reservoir will improve. Although water levels will not drop as fast, they will still be low by the end of irrigation season
175 and will in some low flow years still drop to zero. Also, the statement that "The project will increase flows..." should be qualified. The projected increases are not very significant overall and will actually be less in April-June than they are now in Lower Willow Creek.

79 Column 1, Paragraph 1

176 Should define "irreversibly" and "irretrievably" so folks understand the difference.

80 Column 1, Paragraph 1

177 Statement is not clear. Where would reduced flows occur and where would water be returned to the stream so as not to impact westslope cutthroat.

175. DNRC was unable to quantify either present recreational use of the reservoir or the change in recreational use that would result from the proposed reservoir.

The paragraph in question deals with benefits of GCD's proposed reservoir. Decreases in flows are costs and are discussed under that heading on page 77 of the draft EIS. Changes in flows are presented in detail in Table 4-7.

Table 4-7
Changes in Flow Below GCD Project Lands (cfs)
(North Fork of Lower Willow Creek)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Average	4.9	2.6	1.3	0.4	0.3	-0.9	-6.6	-29.9	-9.6	0.1	5.8	6.6
90th %	7.3	2.4	0.4	0.1	0.0	0.0	-6.2	-10.3	0.0	0.0	4.1	-9.4
80th %	5.9	1.9	0.5	0.3	0.0	0.0	0.0	-27.1	0.0	0.5	1.2	5.8
60th %	2.5	2.5	1.6	0.3	0.0	0.0	0.0	-26.7	0.0	0.1	8.3	3.6
50th %	5.5	2.9	1.2	0.1	0.0	-3.6	-2.4	-26.7	-13.5	0.0	4.8	9.8
20th %	4.9	2.6	1.3	0.1	0.0	-0.7	-20.9	-38.6	-8.2	0.3	14.9	4.6
Minimum	1.5	2.0	1.5	0.1	0.0	0.0	0.0	-18.6	2.6	0.5	0.0	-1.3
Maximum	3.6	1.9	8.7	0.2	0.0	0.0	-20.8	0.0	-41.8	0.0	4.4	12.7

XX percentile flows are those flows equaled or exceeded in XX years out of 100 years.

176. Although the two terms have slightly different technical definitions or interpretations, "irreversible" and "irretrievable" are combined in MEPA to apply to any value or resource that will be permanently lost or altered beyond repair or replacement by the proposed action or project.

177. The final operating plan for GCD's storage project would determine the size of flow releases below the proposed reservoir. If releases below the proposed dam are lower than those presented in Table 5-4 of the draft EIS, a cutthroat trout population might be greatly diminished. The cutthroat trout population could be maintained only if adequate releases are made from the proposed reservoir.

Column 2, Paragraph 1

178 Would a multilevel outlet be feasible in the new dam to help control water temperatures in the stream below?

83-84 Table 8-1

Re-word Case 1 to conform to Case 2 wording as follows in both the DFWP and GCD discussions: "New consumptive uses are limited by existing claims and permits."

179 The difference between the assumptions in the two cases is difficult to follow when reading through the table. The concepts are difficult to fully comprehend easily. However, we don't have any good suggestions to make it more clear.

85-89 Table 8-2 - Economic Impacts

180 Why was wood products used and not mining?

Do you believe this table will be useful to the Board in making a decision. It's pretty vague.

90 Column 1, Paragraph 4

181 There should be more protection to Missoula and Stone container than is indicated by this statement. The status quo will be as good as it is now unless the unlikely situation of a large diversion occurs between Milltown Dam and Missoula.

94 Column 1, Last Paragraph, Lines 6-10

182 Is the statement referring to the entire basin or only to GCD's application? If it refers to GCD's project, the statement is too strong because the only conflict with GCD is in March and April. Should clarify the statement.

Column 2, Last Paragraph

183 We do not favor subordination. However, any subordination would have to be very carefully done so as not to jeopardize the existing low flows in the basin's streams.

95 Glossary

184 Average Annual Flow could also be measured as a rate in cfs as well as a volume in AF.

The Wetted Perimeter Method discussion in this draft, although brief and sometimes too simplistic, was adequate overall. However, we do have some specific comments to clarify the method and its use.

178. A multi-level outlet may help mitigate temperature changes in the stream below the reservoir early in the summer. However, frequent drawdowns to the dead-storage level by late summer and early fall when the maximum depth in the reservoir would be less than 10 to 14 feet would tend to reduce the effectiveness of multi-level outlets for mitigating temperature changes. When the reservoir is completely drawn down there would be little opportunity to select and release water of a certain temperature in order to add cool water to the stream below the reservoir. A multi-level outlet would increase costs.

179. Changing from active to passive voice would not alter the meaning. Table 8-1 is meant to summarize the complex issues related to the Board's decision criteria. These issues are explained more fully in the text of the draft EIS.

180. Wood products were used because the industry received more discussion in the impact analysis than did mining. Impacts of either the DFWP reservations or GCD's reservations on mining activities would be as described in the response to comment 174.

Tables 8-2 and 8-3 were included in the draft EIS to help summarize the levels of impact and summarize the advantages and disadvantages of possible Board actions. More detailed information is contained in the main body of the draft EIS.

181. The statement should read: "Though flows below Milltown Dam would not be legally protected, in a practical sense DFWP's requested reservations would provide some protection to the City of Missoula and Stone Container from the cumulative effects of depletions in the upper basin in the future." See Chapter Three of this final EIS for a discussion of the effect of DFWP's requested reservations on flows below Milltown Dam.

182. The statement refers to the entire basin.

183. Comment noted.

184. Average annual flow can be discussed either as a volume or as a rate. Consistently, annual estimates were given by volume throughout the draft EIS.

100 Column 2, Paragraph 3

The reliance on professional judgement in selecting representative study sites is not confined solely to the
185 wetted perimeter method. It is inherent and a key element in all instream flow methods that utilize field measurements. Our use of professional judgement should not be construed as a limitation not shared by other instream methods.

107 Column 1, Paragraph 1, First two sentences

The fact that these studies have not occurred in the Clark Fork drainage does not invalidate their findings. Principles derived or supported by these studies are not site specific but have region-wide application.
186 Assumptions regarding food production would apply to the Clark Fork as well, provided the metals problem was eliminated and no longer an overriding population control. Performing studies on food limitation in the mainstem Clark Fork is illogical due to the role metals pollution plays in regulating populations.

100 Column 2, Paragraph 5

This rationale, although seemingly logical, is not always true. The shape and form that riffles take in the high gradient headwaters of a stream, where wide, shallow, fast-flowing riffles constitute much of the channels characteristics, may be far different than that in the lower meandering reaches, where slow moving, deep pools separated by short, non-descript riffles are the predominate habitat type. If relatively little accretion occurs between the headwaters and lower reaches, the
187 possibility exists that, in this situation, the instream flow needed for riffle maintenance in the headwaters could be substantially greater than that for the lower stream. The fact that stream flow should increase from the headwaters to the mouth does not necessarily mean that the flow needed to maintain riffles will continually increase with the downstream progression in flow. Irrigation diversions often reduce flow and subsequently channel size in the lower parts of a stream so that, in actuality, less flow will occur there. Racetrack and Flint creeks are examples. Riffle shape and form, which can vary substantially from a stream's headwaters to its mouth, are the key factors determining flow needs.

105 Column 2, Last paragraph, line 11

188 "...accretions of..." should read "...accretions or..."

106 Column 1, Last paragraph, line 5

189 "Idaho" should read "Wyoming"

185. The concern is not that professional judgment was used, but that no information on channel geometry was provided to help determine whether the riffles selected by DFWP are representative of other riffles in the reach. See Chapter Two of this final EIS for further analysis of the wetted-perimeter method.

186. DNRC agrees; until metal toxicity, temperature, and dissolved oxygen problems are eliminated, flow may not be the overriding limitation to aquatic populations in the Clark Fork main stem.

187. Riffle shape and form can be used to determine instream flow needs and they do often vary over the length of a stream. Other factors that could be used to determine instream flow needs are the amount of water needed to provide passage for spawning fish, the amount of water needed for suitable rearing habitat, and the amount of water needed to maintain water quality suitable for aquatic life.

188. Comment noted. "of" should be "or".

189. Comment noted. "Idaho" should be "Wyoming".

107 Column 2, Last complete Paragraph

The wetted perimeter method addresses this potential problem by requiring that all field measurements be collected during a short time span, usually the period starting with the receding high flows of early summer and ending in late fall when the annual low flows are approached. Because this period excludes the peak flows of spring runoff - the dominant force altering channel form - the channel will be stable throughout the period measurements are made. Flood events could, over the years, create new channels, dewater others, and shift
190 the locations of riffles and pools. However, newly created riffles are expected to replace those destroyed on a one-to-one basis and have similar form and shape. While the stream environment is dynamic and subject to change, basic channel form and shape will not be affected, unless the stream is subjected to man-caused or natural events of catastrophic proportions. New riffles will be similar, in form and shape, to the ones replaced. Inflection points determined for these new riffles should not vary from the old, provided "typical" riffles are sampled.

107 Column 2, First complete paragraph

Many components of the WETP program may introduce error into the wetted perimeter predictions. Of these potential error producers, the stage-discharge rating curve for each riffle cross-section is probably the most critical. One assumes that the accuracy of this curve increases as the number of data points increase. However, Bovee and Milhous (1978) concluded, based on statistical analyses, that there is little improvement in accuracy beyond 3 or 4 stage-discharge points. Consequently, the Instream Flow Incremental Method (IFIM) - the "state-of-the-art" instream flow method that the above authors helped to develop - recommends using three stage-discharge data points determined at a high, medium and low flow to calibrate the hydraulic simulation portion of the IFIM model. The same recommendation
191 applies to the Department's wetted perimeter method as well.

Neither the IFIM nor the wetted perimeter method recommend the use of only two stage-discharge points to develop a rating curve due to the potential for "two point" error. At times, however, only two points are obtainable and must be used in the derivation. Bovee and Milhous (1978) concluded that two points can be used effectively if done with care. To minimize "two point" error, they recommend that the calculations incorporate the stage at zero flow (ZF) and that the higher discharge be at least twice as high as the lower discharge. The wetted perimeter method incorporates both of these recommendations.

An examination of Table A-1 shows that the error associated with 2 data points compared to 3 is larger by less than one percent for 9 of the 10 streams. Furthermore, the use of 6 points did not materially decrease error below that of 2 points in 7 of the 8 streams. While the statement that "errors associated with using two data points instead of three resulted in larger errors" is correct, this larger error does not, in most cases, represent an increase of great practical significance. This needs to be stated.

190. Instream flow allocation based on the wetted perimeter method assumes that the shape of the channel will not change over time. The assumption of a stable channel is reasonable for many of the gravel-bed rivers in Montana. However, if the flow or sediment regime of the channel system is altered, for example, by flow regulation, floods, land use, or fire, then the channel will adjust and a new channel geometry with different instream flow requirements may result. The Clark Fork's channel has been extensively modified, and localized channel reaches may be changing in response to channelization and other watershed disturbances. Periodic monitoring of channel geometry at instream measurement sites could document channel stability or changes and provide a basis for adjusting instream allocations during the Board's 10-year review.

191. Comment noted.

108 Column 1, No. 2

While this statement is true, it has little relevance when viewed in conjunction with the "reach concept" described by Spence (1988). For most waters, tributaries in particular, instream flow recommendations were derived at a site near the stream's mouth, with the designated reach extending from the mouth to the headwaters. As
192 defined by the MDFWP, the designated reach merely serves to identify those junior water users who will be subject to the instream reservation, which was derived and will be monitored at a site in the lower stream. A reach, as defined by the MDFWP, does not represent a stream segment having a similar flow regime and the same instream flow requirement throughout its length. In light of this "reach concept," the statement needs to be clarified.

108 Column 1, Number 3

However, in the vast majority of cases, the increased
193 potential for error associated with two points is so small as to have little practical significance.

108 Column 2, Number 4

This statement is, essentially, a rephrasing of No. 3 (the previous statement). Inaccuracies in either the flow or stage measurements, both of which are essential to develop the stage-discharge relationship which, in turn, defines the wetted perimeter-flow curve, could produce the so-called "two point" error in No. 3. Such errors, if they occur, are typically the result of poor technique. The incorporation of various checks, many of a common sense nature, when measuring discharges and surveying cross-sectional profiles will readily bring these errors to light, thus insuring that the man-caused errors that could produce inaccurate wetted perimeter-flow curves are eliminated. Poor technique invalidates all results, regardless of the number of points used to
194 define the stage-discharge relationship. More points won't compensate for poor work.

Inherent in the technology of flow measuring is a built in margin of error. Under ideal conditions, flow measurements can vary up to 5% around the "true" value. For less than ideal conditions, the potential error increases. Consequently, the precise stream flow is never known; our measurements merely provide a close estimate, having a level of accuracy dependent on the conditions. If the intent of statement No. 4 is to address this inherent error, not man-caused error, then clarification is required. If one discharge in a "two point" stage-discharge relationship is grossly over-estimated and the other discharge is grossly under-estimated, then the resulting wetted perimeter-flow curve derived from these data will be inaccurate. How likely will inherent error invalidate the results? One means of testing for this potential error is to define a stage-discharge relationship using 2 points, then add more points and see if the relationship remains the same; or, from a stage-discharge relationship derived from many points, randomly pick a series of 2 points from the relationship, and from each set of 2 points derive a stage-discharge relationship and compare it to the original for similarity. Table A-1, which is essentially an example of the former approach, demonstrates clearly that "2 point" error does not commonly occur.

192. If, in granting the reservations, the Board does not apply Spence's "reach concept," then the conclusion (number 2, page 108 in the draft EIS) is valid. If the Board adopts Spence's reach concept, then DFWP's comment is correct.

193. In a relatively small number of cases, two-point error may make a difference. Unfortunately, it is difficult to separate the streams where two-point error makes a difference from those where it does not. If the Board relies on the analytical methods provided by DFWP, it should realize that the results serve only as approximations or indicators of aquatic habitat at a given location rather than precise measurements completely free of error.

194. Conclusion number 4 was intended to inform the Board simply that the potential for error exists and that the result could be the selection of inappropriate inflection points. Table A-1 in the draft EIS does confirm that the difference in mean percent error is usually within the margin of error whether two or three points are used.

115 Column 2, Paragraph 2, Lines 13-22

There are contradictory statements here concerning return flow. If most (more than 50%?) return flow re-enters
195 streams after 2 to 3 months, how can DNRC assume 50% returns the same month as irrigation and only 25% re-enters the month following irrigation? The former assumption seems more logical than the latter.

123 Figure B-13

This graph is misleading and should be corrected by removing the "DFWP request" line. The reach concept is not being followed by this illustration. We are
196 requesting 50 cfs at the lower end of the reach, realizing it may not actually occur at the upper end. The 50 cfs line should not be shown because it will (and already has) misled others into believing we are requesting more water than is physically available most of the time.

Figures B-14 and B-15 are out of sequence.

151 Table D-5

Shouldn't the 5.9 mg/1 at Deerlodge on August 3 have a superscript (a)?

197 Also, to put the lower Clark Fork reaches shown in perspective to Deer Lodge, the DO criteria should be given since some are B-D1 reaches and have higher DO criteria established.

Rpt/517.16

195. The term "most" is used qualitatively to describe the accumulated return flow volume that re-enters the stream according to Glover (1978) and Brustkern (1986). DNRC's modeling assumed that 50 percent of the return flow re-enters the stream in the month of irrigation, 25 percent re-enters in the month following, and, in subsequent months, one-half as much as the previous month re-enters until returns are effectively zero. Using May for example, 50 percent of the water applied in May (in excess of the consumptive use) is assumed to return in May. The remaining 50 percent returns in subsequent months. Accordingly, 25 percent of the total May excess will return in June and 12.5 percent of the May excess is returned in July. Thus, 75 percent of the return flow re-enters the stream in two months (May and June), and about 88 percent re-enters in three months (May, June, and July). This is not contradictory to the term "most" used in the draft EIS discussion on page 115.

196. DFWP (1986a) indicates that Reach 1 of Flint Creek includes Flint Creek from the Georgetown Lake outlet to the confluence of Boulder Creek. The legal description for this reach is section 6, T5N, R13W to section 4, T8N, R13W. DFWP has requested a flow rate of 50 cfs for this reach.

In a letter from DFWP (Spence 1988), the reach concept referenced in this comment was described. The portion of the letter dealing with DFWP's approach is quoted in the draft EIS on pages 104 through 106.

It appears that DFWP applied for an instream flow of 50 cfs on the entire length of Flint Creek, but intended that the instream flow be measured just above Boulder Creek. Assuming that this is the case, the line on Figure B-13 representing DFWP's request is misleading and should be ignored. See DFWP's comment 192 for the agency's stated definition of the "reach concept" as it appears in DFWP's reservation application for instream flows in the Missouri River basin. In its application for instream flows in the upper Clark Fork basin, DFWP has not identified measuring sites, nor has it clearly stated how the reservations would be enforced.

197. Yes, the a was inadvertently omitted. The B-D1 water quality classification is no longer in use. Below Cottonwood Creek near Deer Lodge the Clark Fork is classified as a C-1 or B-1 stream. The dissolved oxygen standard for both C-1 or B-1 streams is 7.0 mg/l as was used in the table.

February 11, 1989
Deer Lodge, Montana

John Tubbs
re: Clark Fork Reservations
Department of Natural Resources and Conservation
Water Resources Division
1520 East Sixth Avenue
Helena, Mont. 59620-2301

Dear Sir:

I am objecting to the DEIS of the Clark Fork Basin.

198 I do not think this study should have been made until the final decree has been issued by the Water Court.

199 I also believe the DNRC should not have made the study. It should have been made by an outside company.

The DEIS is very inaccurate with many discrepancies, such
200 as the amount of acres irrigated from the creeks that are tributaries of the Clark Fork River.

Sincerely,

Robert Evans

920 Racetrack Rd
Deer Lodge Mont
59722

198. Your comment is noted. Regardless of the status of the adjudication process, prospective water users have an ongoing right to apply for water use permits and reservations. DNRC is legally obligated to process those applications.

199. DNRC's duties, under Monana law, include conducting environmental impact analyses.

200. See the responses to comments 212 and 217.

February 11,1989
Deer Lodge, Mont. 59722

John Tubbs
re: Clark Fork Reservations
Department of Natural Resources and Conservation
Water Resources Division
1520 East Sixth Avenue
Helena, Mont. 59620-2301

Dear Sir:

I object to the DEIS on the Upper Clark Fork Basin wholly on the grounds that until the Basin has a final decree thru the water courts no other stipulation should be made.

201 Ordinary water users had until 4/30/82 to file on their water rights. We still are waiting for the next step after objections to original rights filed. This complicates and muddles the process.

Sincerely,

920 Racetrack Rd
Deer Lodge, Montana
59722

201. See the response to comment 198.

FEBRUARY 13, 1989

DEPARTMENT OF NATURAL RESOURCES
ATTENTION: John Tubbs

REFERENCE: Clark Ford Basin Environmental Impact Statement

Dear Sir:

202 It is obvious that the Environmental Impact Statement prepared by the Department of Natural Resources on the Upper Clark Fork Basin is inaccurate and incomplete. It appears as though the statement is written and intended to justify the request of the Department of Fish, Wildlife and Parks.

203 The drafting individuals repeatedly-verbally say that the instream flow requested by F.W.P. will not effect existing water users, but then in writing admit that there are numerous ways that the instream flow could effect their water use.

There are about 10,000 individuals with water rights in the basin. Only 300 copies of the draft were made available. The public meetings held by the D.N.R. were not publicized in a manner that made it clear to water users that there water rights could be affected. This is clearly obvious by the turn out at the meetings.

204 I would like to request at this time that the comment period on the E.I.S. be extended for a period of 90 days during which time the D.N.R. mail a letter to each of the approximately 10,000 owners of water in the basin. This letter should contain a brief statement as to what F.W.P. are asking for. A questioneer should be attached for each to complete and return asking if they want a complete copy of the E.I.S. and asking whether they feel the request of F.W.P. would adversely effect their existing water right. The results of this survey would determine whether the D.N.R. has acted independently on their mission to compile the E.I.S. or has been seredaded by the F.W.P.

Specifically I am opposed to the F.W.P. request for the following reasons.

1. 205 The Clark Fork is an unadjudicated stream and has never had a water commissioner appointed. Granting this reservation will sooner or later be the factor that will require such a commissioner, the cost of which will be born by all water users. This last has not been addressed and could have far reaching implications on agriculture.

202. See the response to comment 212 regarding errors and omissions in the draft EIS.

203. DFWP's reservations cannot adversely affect any existing rights because DFWP would have a later priority date. The pertinent section of the law reads: "A reservation under this section shall date from the date the order reserving water is adopted by the board and shall not adversely affect any rights in existence at that time" (§ 85-2-316(9), MCA). However, DFWP's reservation may affect future permits or water right changes which might occur in the future.

204. The draft EIS was prepared by DNRC because the Montana Environmental Protection Act (MEPA) requires that an environmental impact statement be prepared where state action could "significantly affect the quality of the human environment." MEPA specifies how notice of an EIS shall be given. In noticing the publication of the draft EIS and the associated public meetings, DNRC met and exceeded these noticing requirements (see the response to comment 216). Water right holders, even when the issue is instream flow protection, are treated the same as other members of the public under MEPA. An additional process is required under Montana water law wherein water right holders, specifically, will have the opportunity to object to the water reservations pending in the upper Clark Fork basin. Water right holders will be individually noticed by first-class mail under this process (§ 85-2-307, MCA). Notice of when the objection period begins will be given once the final EIS is published (see Chapter One of this final EIS).

205. See response to comment 128.

206

207

2. Instream flow versus diverted usage can't be co-mingled without conflict. One man's waste water is another man's primary water right in many cases.
3. Field of flow. The Clark Fork is being completely de-water in many places for irrigation purposes during low flows. It usually has a re-established flow within a few hundred feet do to the surrounding aquafir. This has not had a significant impact on the fish. It does discourage a fisherman on those days just like a 35 below zero day would discourage an elk hunter during hunting season, a natural climate condition. The distance an instream flow could carry will vary greatly. In some places it could be less than half a mile-to try and compute this for the entire basin would not be possible. If left to the D.N.R. to determine the D.F.W.P. will get whatever they ask for.

206. As long as water is available in the stream to satisfy all rights in their order of priority, there is no need to distinguish between return flows and natural flows. Many water users are dependent on water from return flows or wastewater. However, DFWP's reservations would be junior to all existing rights and therefore, by law, cannot be granted if the record of the contested case hearing shows that the use of senior water rights would be adversely affected. Holders of valid existing water rights could continue to divert water—whether it is in the form of return flows or natural flows—if DFWP's instream flow reservations are granted. After all existing rights are satisfied, DFWP would fulfill its instream flow requirements. Because instream flow reservations are non-consumptive, they can generally be exercised in conjunction with senior consumptive rights.

If granted, the reservations would allow DFWP to shut off any new, junior appropriators if fisheries or aquatic values were adversely affected. Thus, consumptive reuse of return flows and wastewater would probably be held to existing levels on the reserved streams.

207. Local dewatering does cause significant problems for fish by limiting movement, reducing available habitat and cover, possibly raising water temperatures and concentrations of toxins, and damaging food production areas. While dewatering caused by senior water rights would continue, DFWP's requested reservations are intended to prevent further harm to the basin's fish and aquatic habitat.

The Board of Natural Resources and Conservation, a group of seven citizens appointed by the governor, will decide whether to grant, grant in part, or deny the reservation requests.

4. It is the contention that F.W.P. want this reservation not to take the water of any existing user, but to prevent additional filings by others possibly out of state entities. There is a better solution. Close the Basin to future application for water use, the result will be water not been used now will flow down the stream as F.W.P. desires.

208

209

5. I contend that F.W.P. have an alterative motive in asking for an instream flow for water that does not exist at the times when they want it most (low flow extreme drought years)-they want to establish the right of instream flows so they can lease or buy existing senior rights now designated for offstream use and convert them to instream flows. The legislation is before the legislature this week. This would be like cross breeding horses with birds so we could ride a horse that flies. Instream flow and consumptive use or offstream usage are not substitutes-(remember guns and butter econ. 101).

210

211

Please enter this an opposing viewpoint to the E.I.S. and the F.W.P. request. I represent myself and the following list of owners of the West Side Ditch CO. of Deer Lodge which owns rights on the Clark Fork River dating back to 1862.

Sincerely,

Ronald C. Kelley
Secretary-Treasurer West Side Ditch Co.

WEST SIDE DITCH CO.
Charles Beck
Pete Beck
George Reistad
Adelyn Lovell
City of Deer Lodge
Grant Kohrs National Historic Site
Ronald C. Kelley

208-209. Closing the basin might not fully serve the purpose of DFWP's reservation request. DFWP is seeking reservations to protect the aquatic habitat from depletions caused either by new permitted uses or by some changes in use. Even if the basin were closed to new permits, changes in use or place of use could still occur. Such changes could adversely affect the aquatic habitat, and DFWP's purpose would not be served. A reservation, on the other hand, would give DFWP legal standing to object to changes in use or place of use.

Basin closure can be initiated in two ways. The legislature may pass a law to preclude the issuance of new water use permits. The second approach is to have 25 percent, or 10 (whichever is less) of the water users within a basin or subbasin petition DNRC to initiate basin closure. Closure may be effective throughout the entire year or for certain times of the year or only for certain beneficial uses.

A petition for basin closure must allege facts showing: (a) there are no unappropriated waters in the source of supply; or (b) the rights of prior appropriation will be adversely affected; or (c) further uses will interfere unreasonably with other planned uses or development for which a permit has been issued or for which water has been reserved.

Within 60 days of receiving the petition, the department must: (a) deny the petition in writing, stating the reasons for denial; or (b) inform the petitioners that the department must study the allegations further before denying or proceeding further with the petition; or (c) initiate rulemaking proceedings for basin closure.

210-211. This water reservation process and the pilot program created by House Bill 707 to lease water for instream flows are unrelated. DFWP does not need a reservation in order to lease water for instream flow purposes, nor would a reservation preclude DFWP from seeking instream flow leases.

RECEIVED

FEB 13 1989

MONT. DEPT. of NATURAL RESOURCES & CONSERVATION

I think you should get all the facts correct before you publish a book. The booklet they had at the water meeting last night was inaccurate. Someone didn't do their work very well.

212

I think you'd better be more concerned about water for food production. Let's not be passing bills to sell & lease water rights to Fish and Game.

213

You need to protect the farmers water right if you want to survive because without farmers noone can survive. Without farmers jobs are eliminated - No need for machinery as those jobs are eliminated. Banks fail, stores

214

215

close. It goes right up the line and affects everyone. You'd better think about it. It'll be your job too.

Marjorie Reistad

212. The EIS process is intended to provide a scientific, objective analysis of the impacts associated with state actions. As such, no particular interest or interest group is held in higher favor than another. The process of writing a final EIS begins with the preparation and publishing of a draft version. Considerable research and effort went into preparing the draft EIS for the Clark Fork to make it as accurate and complete as possible. However, the purpose of a draft is to allow revisions and corrections to be made. In addition to its own internal review, DNRC encouraged the public to point out any inaccuracies or omissions in the draft EIS so that these problems could be corrected in the final EIS. Comments that cite specific errors or deficiencies have been responded to in this final EIS and errors have been corrected. Additional and updated information on certain topics has been included in Chapter Three.

213. Acting on DFWP's reservation request does not require any legislative changes or bills, nor were any suggested. However, the 1989 Legislature passed a bill allowing DFWP to lease water for instream purposes. This legislation (§ 85-2-426, MCA) is discussed briefly in response to comments 210 and 211 and in Chapter Three of this final EIS.

214. Under Montana law, a reservation cannot be granted or used if the record of the contested case hearing shows that the use of senior water rights would be adversely affected. The use of senior water rights, including those rights associated with farms and ranches, is thus protected.

In addition, DFWP's instream flow reservations would provide several indirect benefits, albeit limited ones, to existing irrigators. See page 53 of the draft EIS and the responses to comments 76 and 86 for a discussion of these benefits.

215. Agriculture is and will continue to be an important component of the economies of the upper Clark Fork basin. The requested instream water reservations would not affect senior water rights that are used for agricultural or any other purposes. Local economic benefits resulting from water rights for agriculture will continue to occur irrespective of the requested instream water reservations. See the response to comment 37(b).

February 11,1989
Deer Lodge, Mont. 59722

John Tubbs
re: Clark Fork Reservations
Department of Natural Resources and Conservation
Water Resources Division
1520 East Sixth Avenue
Helena, Montana 59620-2301

Dear Sir:

I object to your DEIS on the Upper Clark Fork Basin for several reasons. The hearings were not well advertised. The fact that only 300 books are available to hundreds of affected water users, with only a total of 60 days objection time. The figures in your background work seem to be plucked out of thin air. For example, page 154, you state, irrigated acres on Dempsey Creek as 1727, my brother and I have a total of 1800 A. irrigated as adjusted by the DNRC themselves. Race Track Creek 13,480 A claimed against your 8,155 A.

216

217

216. The public meetings on the draft EIS held on January 14, 15, and 16, 1989, were announced in all five regional newspapers. A legal notice was published concurrently for three consecutive weeks in the Missoulian, the Butte Standard, the Anaconda Leader, the Silver Star State Post, and the Philipsburg Mail. The draft EIS was also made available at public libraries in Missoula, Butte, Anaconda, Deer Lodge, Philipsburg, and Drummond. A 30-day extension for submitting comments was granted and notice of this extension was provided in the same manner. Copies of the draft EIS were also distributed at all three public meetings and were mailed to anyone who asked to be on the mailing list.

The cost of publishing and distributing the draft EIS is about $9.40 per copy. Because of this expense, DNRC could not send a copy to all water right holders. However, as stated in the public notice, anyone interested in receiving a copy needs only to contact DNRC and provide a mailing address. At this time, approximately 300 copies of the draft EIS have been distributed. See the response to comment 324.

217. The amount of land under irrigation in a basin is difficult to estimate because it changes from year to year depending on water availability and economic conditions. Also, some lands within a basin may be irrigated with water from a source outside the basin. Any definitive inventory of irrigated lands would have to be verified in the field and revised annually.

Several people cited the numbers of acres associated with their permitted and claimed irrigation water rights. Based on water rights on file at DNRC, there are 34,600 acres of irrigated land claimed in the Flint Creek basin (76GJ) and 139,000 acres of irrigated land claimed in the upper Clark Fork basin (76G), for a total of 173,000 acres (Cawlfield 1989). But this total overestimates the number of acres actually under irrigation because some of these lands are irrigated only in years with favorable streamflows or crop prices.

Remember, the best land in the Upper Clark Fork Basin is worth far less without water for irrigation and breaks down to far less dollars for property tax and spending monies in the communities.

218

Sincerely,

Donald Tamcke

Dempsey Creek -
EIS Report
1,772 IRRIGATION ACRES
on Dempsey Creek

	(ACRES)
Don Tamcke + Brother	1,800
Jack Perkins	500
Teddy Johnson/Kenny Fleming	300
Joe Kramer	150
Kelly	400
	3,150
Prison Farm-Approx-	1,280
Beck	400 (?)
	5,680

2/3% of ACRES off.

(response 217, continued)

The estimates of irrigated acreage presented in the draft EIS (Table D-7, page 154) were based on aerial photos, a 1984 aerial inspection, and Water Resources Surveys published by the Montana State Engineer's Office (1954, 1958, 1959). These estimates from the draft EIS show 23,001 acres of irrigated land in the Flint Creek basin and 59,018 acres of irrigated land in the upper Clark Fork basin, for a total of 82,019 acres. This total is close to the 89,525 acres tallied in the early 1970s by DNRC after conducting land surveys based on aerial photos and field inspection (Cawlfield 1989).

CH2M-Hill, a consulting firm, has prepared maps of irrigated acreage in the Clark Fork basin. The maps were prepared relying on Water Resource Surveys from the 1950s and on aerial photos taken in 1983 by the EPA. The Montana State Library digitized these maps and found approximately 107,000 acres of land under irrigation in the upper Clark Fork basin.

The actual amount of land under irrigation in the two basins during any given year probably falls within the range of these estimates. The estimates in the draft EIS are not unreasonably different from the number of acres identified in other surveys and were provided as part of the description of the existing environment or baseline data in Appendix D. They do not have a bearing on the EIS's hydrological model because the model is based on historical stream gauge records, which reflect actual patterns of water use. None of the acreage estimates in Table D-7 were used to analyze water availability.

218. By law, DFWP's reservations cannot be granted or used if the record of the contested case hearing shows that the use of senior water rights, including those for irrigation, would be adversely affected. Thus, land that is currently irrigated would remain so, and the existing tax base in the upper basin would not change. County tax revenues would not decrease because of DFWP's reservations.

2/9/89

DNRC
1520 E. 6th Ave.
Helena, Mt. 59620

Re: DFWP Requests for Instream Flow.

Dear Sirs,

I am in complete favor of DFWP's request for maintaining instream flow of water.

I feel we're rapidly loosing it - and if we don't do something soon to protect what water we now have in the Clark Fork, we will suffer greatly - later in many ways.

My vote is for the DFWP proposal. Please help all you can.

Sincerely
K. O. Weaver - Lolo

K.O. WEAVER
Box 484
Lolo MT 59847
PH. 273-6597

219. Your recommendation is noted. By its inclusion in this final EIS, your recommendation will be part of the legal record presented to the Board.

John Tubbs
re: Clark Fork Reservations
Department of Natural Resources and Conservation
Water Resources Division
1520 East Sixth Avenue
Helena, Mt. 59620-2301

RECEIVED
FEB 14 1989
MONT. DEPT. of NATURAL RESOURCES & CONSERVATION

Dear Mr. Tubbs,

I am writing on behalf of the Montana Chapter Sierra Club concerning the Upper Clasrk Fork Basin Water Reservation Applications. We wish to commend the Department's objectivity and informativeness in preparing its draft enviromental impact statement. The broader significance of these two applications for the future of water use in Montana can not be understated. The future development of agriculture and water quality are at issue here. 220

The Sierra Club strongly supports DFWP's application since it is clearly in the interest of the vast majority of the Basin's residence and their future generations. Water quality in the Basin can only be assured if DFWP's application is - not subordinate to future comsumptive demands. 221

Through our Bitterroot-Mission Group, the Montana Sierra Club Chapter is active in the Clark Fork Coalition. We have read their written comments on these applications and wish to be on record as generally supporting their suggestions rather than repeating specific comment in this letter. We would emphasizes the need to more carefully weigh the cost effectiveness of the increased consumptive use of the Flint Creek water in the GCD application when trying to resolve the conflict between the two applications such as during the month of April. 222 223

We recognize argiculture's need and right for a consumptive use of water when such use is cost effective and does not degrade our environment. Montanans have established a policy of nondegradation of our streams water quality. Therefore, option 3 page 86 granting both reservations, but giving DFWP priority over GCD seems to be in the best interest of the the basin's residents. The water right for instream flow should not be subordinate to any future consumptive use. A determination of the cost effectiveness of GCD's application would be postponed and water quality protection would be given its needed emphasis by option 3 page 86. 224

We thank you for the opportunity to present our views.

Richard Boehmler

Richard Boehmler, member
Execuitive Commettee
Montana Chapter
Sierra Club

220-222. Your comments and recommendations are noted. By their inclusion in this final EIS, your recommendations will be part of the legal record presented to the Board.

223. When making its decision, the Board will weigh the costs and benefits of both applications to determine whether they are in the public interest. See Chapter Two of this final EIS.

224. Your recommendation is noted. By its inclusion in this final EIS, your recommendation will be part of the legal record presented to the Board.

RECEIVED
FEB 14 1989
MONT. DEPT. of NATURAL RESOURCES & CONSERVATION

February 13.1989
Deer Lodge,Montana

John Tubbs
Department of Natural Resources & Conservation
152A East 6th Avenue
Helena, Montana 59601

Dear Mr. Tubbs:

The Deer Lodge valley has always been agricultural community.

225 I am writing you to protest to the E.I.S. unfair statement to agriculture. The statement seems to favor the Fish, Wildlife, and Parks committee.

I feel that agriculture should be considered first.

Sincerely,

Ethel McClellan
Rt 208
Anaconda Mt. 59722

225. See the response to comment 212.

Feb. 12, 1989

Mr. John Tubbs:

Water Reservations for Clark Fork

Dear Sir:

I had the opportunity to look over the Draft E.I.S. on the
226 Instream Flow for the Clark Fork River. I found it to be very poorly done and slanted to favor the Dept. of Fish, Wildlife and Parks.

My objections are listed below:

1. Acreage of irrigated land in nearly all areas are grossly
227 understated. On Warm Springs Creek, west of Garrison, ;you list 52 irrigated acres. There is approximately ten times that amount of irrigated ground.
2. The meetings the D.N.R.C. held for objections were poorly
228 advertized. In Deer Lodge the meeting was so well hidden that a number of people couldn't find it.
3. The amount of water the Fish and Game are requesting is
229 ridiculously excessive.
4. This Draft should be scrapped and a new one done that at
230 least has the correct amount of irrigated ground.
5. A private firm that has no connection to the Fish and Game
231 or other water users should be hired to do this E.I.S.

Sincerely,

William F. Murphy

William F. Murphy, Rancher

226. The purpose of publishing a draft EIS is to encourage public comment on the decisions to be made and to bring to light any specific errors or omissions in the environmental impact analysis and text. This final EIS includes new and corrected information and clarifications of the material presented in the draft. See also the response to comment 212.

227. See the response to comment 217.

228. See the response to comment 216 for a discussion on the issue of public notice. The public meeting in Deer Lodge was held in the Deer Lodge Elementary School music room. It was not the intention of the DNRC to hide the location. In fact, just the opposite, public comment was being sought out, as is explained in the response to comment 212.

229. See the responses to comments 116, 133, and 310.

230. See the response to comment 217.

231. DNRC and DFWP are separate state agencies, each operating as directed by the legislature and governor.

Feb. 11, 1989
Helena Mont.

RECEIVED
FEB 14 1989
MONT. DEPT. of NATURAL RESOURCES & CONSERVATION

Jack Franklin

Dear

As I told you last Tue Feb. 7 I felt the E. I. S. on the upper Clark Fork river basin leaned toward the D. F. W. + P and since I done had time to look it over some more, I am more convinced than ever.

232 on page 90 (under advantages) gives D. F. W. P. legal standing to object to new permits and future changes in water rights.

233 This is not an advantage to my way of thinking

234 Your table D7 on page 154 is so far off it is a crime

235 Table D6 on page 152 I do not understand.

236 I disagree with all the Economic impacts, taxation and population inputs on page 68, be on Economics you should know better than that

237 I feel that Agriculture did not get a fair shake in this E. I. S. and it should be done over.

Sincerely
Jack A Perkins

232. See the response to comment 212. The draft EIS describes both advantages (see page 90 of the draft EIS) and disadvantages (page 91 of the draft EIS) to granting DFWP's requested reservations. GCD's request was treated in the same manner (see pages 92-93 of the draft EIS).

233. Granting DFWP's instream flow request can represent an advantage or disadvantage. Granting the instream flow requests can be seen as an advantage because it would give DFWP the legal right to protect the fishery, recreation, and water quality resources from further depletions due to new uses or changes in use. At the same time, DFWP's requests can be seen as a disadvantage, as stated on page 91 of the draft EIS, because the legal right would allow DFWP to object and potentially preclude future consumptive development of the basins water resources.

234. [HV. ac/lc] See the response to comment 217.

235. [HV. lc] Table D-6 in the draft EIS identifies the amount of undeveloped irrigable land in the upper Clark Fork basin. Irrigable lands must have an economical source water as well as proper soil, climate, and topographic conditions to sustain irrigation. The right-hand column lists the number of irrigable acres which could be developed in the upper basin when physical water availability is not considered. The left-hand column lists the number of acres which could be developed when physical water availability is considered. The difference between the values listed in each column shows that water, not land, is the constraint to development on the tributary streams.

236. Statements made on page 68 of the draft EIS reflect that if DFWP is granted instream flows at the lower inflection point, the impact on economic activity, taxation, and population in the upper basin would be minimal.

237. The focus of the draft EIS was the decisions to grant, grant in part, or deny DFWP's and GCD's reservation requests. When analyzing the decision concerning DFWP's requests, any discussion of agriculture was limited to the agricultural impacts of granting DFWP's request. For GCD, the discussion focused on the approximately 20 ranches which could directly benefit from the project.

RECEIVED

FEB 14 1989

MONT. DEPT. of NATURAL RESOURCES & CONSERVATION

Dear Mr. Tubbs

I am writing to you about the E.I.S on the Upper Clark Fork Basin. This
238 report is very inaccurate, very slanted and does not include anything on the impact on agriculture.

I am very unhappy with the D.N.R.C. for putting out such a poorly written
239 and researched report. I think it should be rewritten and researched more thoroughly with more emphasis on the impact on agriculture.

Having read this report I was very
240 disappointed that not one rancher was interviewed.

Sincerely
Randall E Perkins

238. See the responses to comments 212 and 217. Impacts to agriculture were not omitted from the draft EIS. Discussions of the impacts of reservations on agriculture can be found in the draft EIS on page 51 (water quantity impacts), pages 54 and 55 (agriculture impacts), pages 62 and 63 (local economic impacts), pages 64 and 65 (water quantity impacts), page 67 (land use impacts), page 68 (economic impacts), page 69 (water quantity impacts), and page 71 (economic impacts).

239. See the response to comment 238.

240. DNRC did contact ranchers, either directly or indirectly through the conservation districts, when specific information was needed. The public, including ranchers, was also given the opportunity to state their concerns at three scoping meetings in the spring of 1987. Several farmers and ranchers were present at these meetings. The DNRC staff met with or talked with GCD board members (most of whom are ranchers) to discuss the analysis that DNRC was preparing on several occasions. One result of this discussion was that the reservoir operation model was modified to account for senior water right holders on Lower Willow Creek.

MONTANA POWER COMPANY
GENERAL OFFICES: 40 EAST BROADWAY, BUTTE, MONTANA 59701 • TELEPHONE (406) 723-5421

LEGAL DEPARTMENT
ROBERT P. GANNON
VICE PRESIDENT AND
GENERAL COUNSEL
MICHAEL E. ZIMMERMAN
PAMELA E. MERRELL
ROBERT T. O'LEARY
EDWARD F. BARTLETT
DANIEL O. FLANAGAN
KARLA M. GRAY
PATRICK T. FLEMING
MICHAEL P. MANION
ARTHUR V. WITTICH

February 13, 1989

Mr. John Tubbs
Department of Natural Resources
and Conservation
Water Resources Division
1520 East Sixth Avenue
Helena, Montana 59620-2301

RE: Clark Fork Reservations

Dear Mr. Tubbs:

For The Montana Power Company, I appreciate this opportunity to comment on the Draft Environmental Impact Statement regarding the Clark Fork Basin Water Reservation Applications. I have a general comment to make pertaining to the preliminary recommendation made regarding Granite Conservation District's (GCD) application. The preliminary recommendation seems inconsistent with findings made regarding the project's economics and water availability. Specifically, DNRC recommends that:

241 (1) the Board grant GCD's request with the condition that construction must begin by 2002, the year proposed by GCD in its application (GCD 1986). If GCD does not begin construction by this time, the reservation would be automatically revoked; or (2) the board deny GCD's application but subordinate DFWP's reservation to some level of future consumptive development.

The first of these preliminary recommendations ignores findings indicating that the development GCD proposes is not economically viable without some subsidy and that it probably cannot be constructed and operated without adversely affecting senior water rights. Given these findings, to permit the construction would be ill-advised.

241. See the responses to comments 243 and 349 and also Chapter Two of this final EIS.

Further, in analyzing the water availability issue, one should not give undue regard to the mitigation alternatives suggested by GCD. But for the alternative of an exchange between WWPC, MPC and Hungry Horse Reservoir, the alternatives do
242 not appear to be feasible. And, an exchange would be possible only if adequate consideration were given in the exchange transaction. This cost would only emphasize the unfavorable economics of the proposed project.

Water reservations should be made only when the statutory criteria are met. To grant a reservation while at the same time assuming that economic reality will prohibit the perfection of the
243 reserved rights and not giving full weight to water availability facts, is not fair to the applicant or to the holders of senior water rights in the basin.

Sincerely,

Michael E. Zimmerman

MICHAEL E. ZIMMERMAN

242. The four approaches that GCD has suggested to overcome constraints possibly posed by hydropower water rights are discussed on page 57 of the draft EIS. The likelihood of any one of the approaches being successful is uncertain. However, there remains some possibility that one of the approaches, such as exchanges from Hungry Horse reservoir, may be successful.

243. The Board may not grant a water reservation unless it finds that the proposed use meets the statutory criteria of purpose, need, amount, and public interest (§ 85-2-316(4)(a), MCA; ARM 36.16.107B). Economic feasibility is assessed under the public interest criterion. After the contested case hearing, the Board will consider all of the available evidence in light of these criteria when making its decision.

Clark Fork Coalition
P.O. Box 7593 • Missoula, MT 59807 • (406) 542-0539

7 February 1989

John Tubbs
re: Clark Fork Reservations
Dept. of Natural Resources and Conservation
Water Resources Division
1520 East Sixth Avenue
Helena, Montana 59620

Dear John,

We have general and specific comments on the draft environmental impact statement for the in-stream flow requests in the upper Clark Fork basin. The coalition appreciates the work you and other DNRC staff members have put into this document, especially given the timing of the process with the statewide drought. We're sure it has been a frustrating review. We will be involved in this process up to the time of the board's final determination. If we can be of help, do not hesitate to tap us. 244

Based on the DEIS and our knowledge of the upper basin, we have determined that preserving in-stream flows will not adversely affect any current water-consumptive activities in the region. The opposition to DFWP's proposal by agricultural interests is a product of ingrained suspicions about government. They are not grounded on fact. We remind DNRC and the board that a final recommendation should produce benefits for a majority of basin residents. Preservation of in-stream flows will do that. While we strongly support agriculture, we also feel its interests should not always have primacy over those of sportsmen, recreationists, municipal water users and industries. That has long been the history in the upper Clark Fork. 245 246 247

Recommendation of the Clark Fork Coalition

We recommend adopting the in-stream flow request as proposed by the Montana Department of Fish, Wildlife and Parks. There is no compelling reason to adopt reservations at flows less than requested, and we recommend strongly that the reservations not be subordinate to future consumptive demands. The reservations should be treated as a water right and only subject to 10-year review (such as with the Yellowstone). Any changes in the reservations should only come after a determination that they are no longer needed, as spelled out in the Montana Water Use Act. 248

The coalition takes no position at this time on Granite Conservation District's request. But we urge DNRC to scrutinize closely the need and economics of the reservoir proposal, and recommend that DFWP's request not be subordinate to GCD's request. 249

244. Comment noted.

245. Under Montana law, a reservation cannot be granted if the record of the contested case hearing shows that the use of senior water rights would be adversely affected. If granted, the instream flow reservations requested by DFWP would be junior to all existing water rights, would be nonconsumptive, and would not alter stream flow in any way.

246. Legitimate concerns from many special-intereset groups have been aired. Farmers and ranchers in the upper Clark Fork basin have expressed the concern, among others, that DFWP's requested reservations could impede further agricultural development in the basin and that DFWP may frequently object to proposed changes in use and place of use, ballooning the costs and time needed to apply for a water right change.

247. In making its decision on the reservation applications, the Board must weigh whether the reservations are in the public interest. See the introduction to Chapter Two in this final EIS for a copy of the criteria included under public interest in the Administrative Rules of Montana.

248-249. Your recommendations are noted. By their inclusion in this final EIS, your recommendations will be part of the legal record presented to the Board.

General Comments

1. As we pointed out at the Bonner public meeting, DNRC should have held official public hearings on the proposals, as prescribed in MEPA. The agency didn't need a petition from the public. Given that an EIS was prepared and there has been much interest in the basin in water reservations, the public should have been given more opportunity to comment publicly. Question and answer sessions don't quite encourage this. Moreover, MEPA hearings would include an official record, which would help in determining a final recommendation. 250

2. DNRC should make a determination soon as to who has standing at the contested hearings. If, as DNRC has suggested, the coalition might have standing, it would help us to see that determination on paper. 251

250. Comments noted. MEPA does not require an agency to hold formal hearings unless a written request to do so is made. In the case of the three public meetings held in January on the draft EIS, no such request was made. DNRC elected to conduct public meetings because it was felt that a great deal of misinformation existed. The meeting format offered the chance to take formal comments on the draft EIS and also provided an opportunity to answer questions about the reservation process and the pending applications. While the meetings were not conducted in the style of a formal hearing, the meetings were tape recorded and these tapes were referenced in preparing the final EIS. Summaries of the comments and DNRC's responses are provided in this final EIS. As such, the comments made at the public meetings are part of the legal record presented to the Board.

The public was given opportunity to comment. The comment period on the draft EIS was originally set for 60 days. During this period, three public meetings were held: January 16 in Drummond, January 17 in Deer Lodge, and January 18 in Bonner. As stated in the response to comment 216 the meetings were noticed in five regional papers once every three weeks. At the end of the 60 day period, several requests were made to extend the comment period. DNRC responded by extending the comment period by 30 days.

251. The Board of Natural Resources and Conservation, not DNRC, conducts the contested case hearing and makes a determination on reservation applications. Accordingly, it is the Board's decision as to who has standing to participate as a party at the contested case hearing. The coalition may petition the Board in writing to get a determination on standing.

252 3. The DEIS should discuss possible effects of adjudication, and provide at least some ballpark figures on how many water permits and claims now exist in the upper basin.

4. The coalition sees innumerable benefits to DFWP's request, including:

- protection of fish, wildlife and recreation

- maintenance of flows necessary to dilute metal pollution

- enhancing the economic values of the upper river fishery, now estimated to represent between $1.5 and $3.1 million annually (Duffield et al, 1987); and stabilization of the outfitting industry on the river, which now includes 20 separate operators (DEIS p. 44).

- protection of Missoula's expanding riverfront park program, estimated to have cost more than $2i million in easements and title purchases.

253 - protection of water quality gains made from recent improvements at the Missoula sewage treatment plant, which have cost $7-8 million since 1981. Moreover, the reservations may prevent similar future investments by industry and the city. Because the Water Quality Bureau calculates discharge limits on 10-year average low-flows, not protecting current flows will result in additional investment that ensure discharges meet standards.

- protection of gains made in water quality from Stone Container Corporation's new color removal system, which cost the company $3 million for installation and $1 million a year to operate.

- assurance that downstream aquifers used for domestic use, such as Missoula's, have adequate amounts of water for recharge, and that its quality is not compromised by lower quality river water.

- legal standing for DFWP to object to new water permit applications in the upper basin.

- making it easier for senior water users to protect their rights from encroachment by junior appropriators.

252. The adjudication process in the Flint Creek basin (76GJ) is ongoing. According to the Montana Water Court, resolution of objections is nearly complete (Lambert 1990). After this process is completed, the temporary preliminary decree in this basin will be enforceable. A preliminary decree will not be issued until federal reserve rights are compacted.

The adjudication process in the upper Clark Fork basin (76G) is just beginning. Objections have been consolidated and conferences between the applicants and objectors are being held. The process of resolving objections might be completed by late 1991, or, if the cases are not resolved quickly, it may take two years or more (Bloomquist 1990).

Figures 3-1 and 3-2 in the draft EIS (pages 16 and 17) show the amount of water claimed and permitted in the Clark Fork basin. In Flint Creek basin (76GJ), there are 28 claims for surface water with a maximum total diversion rate of 2,847 cfs and a maximum annual diversion of 506,032 af. There have been 15 permits issued in the Flint Creek basin since 1973 with a maximum total diversion rate of 61 cfs and a maximum annual diversion of 19,904 af. In the upper Clark Fork basin (76G), there are 3,060 water right claims for surface water with a maximum total diversion rate of 10,200 cfs and a maximum annual diversion of 2,313,237 af. There have been 81 permits issued in the upper Clark Fork basin since 1973 with a maximum total diversion rate of 113 cfs and a maximum annual diversion of 17,507 af.

253. Granting DFWP's reservation requests would help protect instream flows and, in turn, would help protect the fishery, wildlife, and recreational resources. Water quality in the upper Clark Fork basin would also be protected. This protection in and of itself will not enhance these resource values. DFWP, in its reservation application, states that if the EPA Superfund clean-up is successful, the aquatic habitat would be enhanced (DFWP 1986a).

While The Net Economic Value of Fishing in Montana (Duffield and others 1987) provides an estimate of the total value of fishing in the upper Clark Fork basin, there are no estimates of how these benefits change as flow changes. Therefore, it is difficult to objectively analyze the benefits and costs of granting DFWP's full request compared to granting a reservation of some lower flow.

DFWP's reservations would offer no legal protection of flows below Milltown Dam. These instream flow reservations would not protect flows through Missoula because no reservations are requested below Milltown Dam. If a consumptive use was permitted and developed between Milltown Dam and Missoula, water could be withdrawn from the Clark Fork, and DFWP would have no legal basis for objecting to the subsequent depletions. Though DNRC knows of no plans for such development, it is a possibility.

Comments on Draft Environmental Impact Statement

1. We have determined that DFWP's request meets criteria set by the Water Use Act for need, amounts and that it is in the public interest (p. 81). Some further considerations for DNRC's evaluation of those criteria (p. 82 and 83) are:

- in considering whether benefits exceed costs, values of the current fisheries and investments of DFWP and the U.S. Forest in fishery enhancement should be factored in. In addition, it seems appropriate that mitigation costs for fishery protection from roadbuilding, logging and mining should be included. Present fish stocks, management programs and past mitigation represent capital investments that could be threatened by de-watering should in-stream flows not be protected. While DFWP cannot say exactly how many fish would be lost should new consumptive uses be granted, it may be possible to develop a probability model, based on historic flows in the basin, that estimates fish production based on stream flows. If nothing else, biologists can say with certainty that there will be some fish loss should water consumption be increased from the present. The only possible adverse economic factor to granting DFWP's proposal might be the opportunity cost of denying future consumptive users water because their rights would be junior to the department's reservations. According to the DEIS (page 54), this opportunity cost may be insignificant, given the amount of potential irrigable acres left in the basin, and the small likelihood that it will be irrigated in the near future because of high cost.

254

- DNRC should enumerate exactly what "reasonable alternatives to granting DFWP's request" the board will look at in its criteria evaluation (p. 83, "Public Interest," subsection c.). That implies there are reasonable alternatives to the reservations that produce the DFWP's objectives of fish and wildlife protection, and maintaining flows during winter and spring for diluting metals.

255

- Under "Irretrievable Loss" on page 84 the DEIS says, "There is the possibility that by not granting the reservation, a stream or reach could be depleted, causing irretrievable damage to fish populations of special concern." This is more probability than "possibility." One more water permit in most of the tributaries could easily accomplish this.

256

2. Throughout the DEIS reference is made to the eight years out of 10 that flows exceed the requests during the spring, or that water is available for consumptive uses only below Rock Creek in the winter. However, that will only be the case in the future given a static state (ie., similar precipitation years, no new consumptive uses). Without in-stream flow reservations, conditions will likely get worse, a point not analyzed with specificity in the document. Worst-case situations are not mentioned. What would flows be should additional consumptive rights be granted? The DEIS should have analyzed a few situations based on consumptive uses that might occur should in-stream reservations not be granted.

257

254. The value of any asset depends on the future services the asset is expected to provide, not on the historic cost of the asset. For example, a $50,000 house which is damaged by fire and is repaired at a cost of $30,000 is still worth $50,000, not $80,000.

The upper Clark Fork fishery provides benefits to anglers because it provides opportunities for certain types of recreation. The recreation opportunities depend on management programs and mitigation for past damages. However, the value anglers place on the recreation opportunities provided by the upper Clark Fork depends on the quantity and quality of recreation, not on the cost of providing the recreation opportunities.

DFWP was not able to give DNRC any quantitative estimates of the decreases in future fish stocks that would result from further depletions of the Clark Fork or its tributaries. DNRC therefore could not estimate the value of any resulting decrease in benefits.

The potential costs of DFWP's request are discussed on pages 75 and 76 of the draft EIS.

255. Reasonable alternatives were identified. The draft EIS examined two alternatives: granting less than the requested amount and denying the request. The Board has the authority to grant instream reservations of any amount of water up to 50 percent of the average annual flow on gauged streams.

256. Table 8-1 on page 84 of the draft EIS summarizes the conclusions of the EIS in terms of the Board's decision criteria. The sentence in question is a statement of fact: if DFWP's reservations are denied, further depletions could occur and could damage fish populations of special concern. Tributaries are especially vulnerable because of their lower volumes and because they often serve as spawning streams. The probability of such depletions occurring was not addressed.

257. Streamflows would likely be depleted if new consumptive water uses continue to be developed. This is the very reason that DFWP is making an instream flow request. In Chapter Five of the draft EIS, pages 69-72, DNRC analyzed the effects of an additional 8,362 acres of irrigation development. Future irrigation development is used to forecast future water depletions because irrigation has historically consumed the greatest amount of water in the basin. A great deal of agricultural land is already under irrigation in the upper basin. The estimate of 8,362 acres of irrigation development is thought to be a high estimate of the actual potential for irrigation development and could represent the largest possible amount of depletions due to agricultural use. Industrial, mining, and municipal appropriations also might increase in the future and might further deplete flows.

4. Figure 3.1 is confusing. We assume the column on the left
258 (CFS) is for off-stream diversion, and the right column (acre-feet) is for storage. But we're not sure.

5. Mining information on page 44 is dated. Both Pegasus and Montana Mining and Timber have developed their mines. The Gold
259 Creek mine is producing and MMT reportedly sold its interest recently. This section should also include mining near Georgetown Lake, Philipsburg and Deer Lodge.

258. The right column reflects the volume of water claimed during a given period of use, and the left shows the flow rate claimed. Not all water users will divert water at the same time, so more water may be claimed than actually flows in the stream at any one time.

259. Some of the proposed mining projects cited in the draft EIS have progressed since the baseline information was developed.

Table 4-8 displays the active mining permits in the upper Clark Fork basin, as issued by the Montana Department of State Lands. The Montana Resources, Incorporated (MRI) mining operation in Butte uses substantial amounts of water. MRI has a water right for 60 million gallons per day. Its average daily use is about 18 million gallons (Webster 1990).

Beal Mountain Mining Company's open pit and leaching operations consume a maximum of 565,000 gallons of water a day. Average daily consumption at this mine is estimated to be 280,000 gallons (Montana Department of State Lands 1990).

The basin's other permitted mines use very small quantities of water or no water in their operations. Placer mines recycle water, and their only consumptive water uses result from losses due to evaporation (Webster 1990). Some of the upper basin's permitted mines are inactive or in their reclamation phases.

Table 4-8
Mining Operations, Upper Clark Fork Basin, 1990.

Company	Acreage	County	Type of Mine/Mill
Beal Mountain Mining Inc.	1,182	Silver Bow	Open Pit/Leach
Montana Resources Inc.	5,103	Silver Bow	Heap Leach/Concentrator
New Butte Mining Inc.	189	Silver Bow	Underground
Anaconda Minerals	145	Deer Lodge	Quarry
Anaconda Minerals	15	Deer Lodge	Silica Quarry
Cable Mountain Mine Inc.	93	Deer Lodge	Placer
Big Horn Calcium Company	17	Granite	Open Pit Limestone
Montana Mining and Timber	244	Granite	Underground
Skakako Grazing Inc.	6	Granite	Placer/Open Pit

Source: Montana Department of State Lands. 1990.

6. On page 52 the document says "DFWP's instream flow requests reserve only about a fourth of the water that eventually flows through Missoula during summer months, and about half of present winter flows." The qualifier "only" infers that the requests are not critical to Missoula. This is extremely incorrect. The 600 CFS reservation requested for Reach #4 is extremely important to Missoula and the river below. During recent summers discharge of the river at Missoula has been as low as 700 CFS. 600 CFS is hardly one-fourth of that. Without that guaranteed 600 CFS, water levels in Missoula and downstream could be reduced to a trickle. Even after the addition of the Blackfoot and Bitterroot, the river below Missoula has been below 900 CFS in recent summers. Floaters cannot use the Alberton Gorge at this level. Risking further reduction would eliminate the growing recreation and outfitter use on this stretch of river.

Managers of the sewage plant, Stone Container Corp., downtown businesses would agree that the river cannot afford more depletion. Guaranteeing a reservation of at least 600 CFS in Reach #4 is essential. (Interestingly, on page 67 the document
260 seems to contradict the position that in-stream reservations are not important to Missoula by saying that "the lower inflection point would not protect the recreational setting at Missoula's River Front Park." That, to us, infers the upper inflection point, and thus more water, would help protect the recreational setting. But several sentences later, on page 68, the document says "additional consumptive water uses in the upper Clark Fork basin would be too small to affect Missoula's River Front Park." What is DNRC's opinion? Are in-stream flows important to Missoula's recreational setting or not? And is the department really saying that the city is immune to the effects of all present and potential consumptive uses in the upper basin?)

Even flows reduced by sprinkler irrigation of the 8,362 irrigable acres in the upper basin, which DNRC estimates would be about 3 percent of the current flow at Missoula, are critical. The river is already too low most of the summer and fall below Milltown for good fishing and floating. Moreover, any additional diversions upstream could adversely affect future developments below Milltown. Reductions could result in increased sewage costs to Missoulians, should sewage plant effluents need additional treatment because the river is too low. Stone Container, which employs more than 700 people, could face the same dilemma.

7. On page 52 the document says in-stream reservations would not
261 improve water quality. That's true, but it's just as important to emphasize that without the reservations water quality will get worse.

(response 259, continued)

In addition to permitted mines, there are 138 smaller mines (five acres or less) which are allowed to operate under Small Miner Exclusion Statements (SMES). The number of SMES mines in the basin are displayed by county in Table __. Less than 50 of the upper basin's SMES mines are active. None of these mines uses notable amounts of water (Webster 1990).

Table 4-9
Small Miner Exclusion Mines, Upper Clark Fork Basin by County. 1990.

County	Number of SMES Mines
Granite	79
Powell	40
Silver Bow	6
Deer Lodge	13
Missoula	0
TOTAL	138

Source: Webster. 1990.

260. DFWP's requested instream reservations for any amount would not legally protect the recreational setting at Missoula's River Front Park because legal protection of instream flows would end at Milltown Dam. It is unlikely, however, that major additional consumptive uses would develop between Milltown Dam and Missoula, giving some degree of protection to Clark Fork flows through Missoula. The Blackfoot River contributes the majority of historical summer flows in the Clark Fork at Missoula.

The City of Missoula and Missoula County have the option of requesting instream flow reservations for municipal purposes or for protection of water quality. Such reservations could help to ensure desirable flows through the city. Instream reservations can only be obtained by public entities; therefore, Stone Container Corporation does not have this option.

261. In the absence of an instream reservation, water quality could deteriorate if further depletions of flow or increases in waste discharges occurred.

8. On page 68 under "Economic Impacts" the document says, "Slight changes in flows would not notably affect the tourism and recreational values of upper basin waterways." What is "slight" and what documentation backs this definitive statement? As we stated, 600 CFS at Reach #4 is critical for recreation below Missoula.

262

9. The document says on page 78 that "DFWP's reservations would be the primary impediment to new irrigation development in the basin." This is incorrect. Senior water rights are just as much, if not more, an impediment.

263

10. The table on page 87 underestimates the economic benefits of reserving in-stream flows at the higher inflection point in case 2, especially when it says the reservations will be highly beneficial to fish, wildlife and recreation. It also underestimates the economic and wastewater treatment benefits of the reservations in case 2.

264

262. Compared to aquatic habitat or fish, tourism and recreation are not likely to be as affected by small changes in flow.

A decrease of 600 cfs at Reach 4 would be a major change in stream flows, having potential for significant impacts in the upper and middle Clark Fork basins. Six hundred cfs represents the diversion needed to flood irrigate approximately 24,000 acres.

263. No such statement appears on page 78. This appears to be a part of a sentence from page 76. The full sentence is "If existing water rights do not limit future development, DFWP's reservations would be the primary impediment to new irrigation development in the basin." The preceding paragraph states "If existing water rights limit future development, or if the basin is closed to new development, little if any water, other than spring runoff or from changes of other uses, would be available for new irrigation projects in the upper Clark Fork basin. DFWP's reservation requests would have little if any effect on new permits for irrigation development because DFWP is not asking to reserve high spring flows." The author of this comment appears to agree with what the draft EIS actually says. See also the response to comment 130.

264. Maintaining instream flows would be highly beneficial to the resource, but any indirect benefits to the travel and recreation industry would be less pronounced. Instream flows are only one of several factors contributing to the economic vigor of travel and recreation-related businesses. A few travel and recreation-related businesses might even be unaffected by diminished instream flows. Therefore, the benefits of the reservations to the travel and recreation industry were rated as "none-to-low."

Instream flow reservations on the upper Clark Fork would help maintain flows available to dilute nutrients from municipal wastewater discharges. A recent study (Ingman 1990) indicates that discharges from the Deer Lodge wastewater treatment plant contribute enough nutrients to allow algae to grow to nuisance levels. Large algae growths have caused dissolved oxygen levels to fall below what is allowed by state water quality standards. By limiting new consumptive water uses during the summer when these algal growths appear, DFWP's reservations could help limit the degree of wastewater treatment that might be required of Deer Lodge.

DFWP's requested reservations would not legally protect flows below the confluence with the Blackfoot River, including those flows that dilute Missoula's wastewater. See Chapter Three of this final EIS for a discussion of DFWP's requests and the legal and practical implications for flows below Milltown Dam.

11. On page 105 we disagree with the contention that FERC can be relied on to find "practical solutions" to de-watering caused by
265 small hydro developments. If such is the case, what documentation is there? We have found FERC to be unreliable in finding practical solutions to any problem.

12. We agree that stream gauging may be most effective when done
266 at the lower end, or the mouths of tributaries (discussion pages 104 and 105).

13. On page 115, DNRC assumes that 85 percent of diverted water is returned to streams. It also assumes certain rates (50 percent in the month of irrigation, 25 percent the following month,
267 etc.). Are these estimates based on any data, or only on the cited literature (Glover 1978 and Brustkern 1986)? These are crucial estimates and if possible should be based on more evidence than what is presented.

14. The Flint Creek model is based on "limited historic flow data
268 collected near the mouth of Flint Creek." (page 115). What is that data, is it adequate for modeling?

(response 264, continued)
Overall, the benefit to wastewater dilution would be moderate. If instream flow reservations had been sought below Milltown Dam, this benefit may have been high, considering the volume of effluent produced by Missoula and Stone Container.

265. Every nonfederal hydroelectric facility must be licensed by FERC before construction begins. Under the Federal Power Act, FERC must consider environmental protection issues when issuing a license, and it may modify or deny an application if fish and wildlife, recreation, or other environmental qualities would suffer due to dewatering. Further, FERC must adopt license conditions based on recommendations made by state and federal fish and wildlife agencies unless they are inconsistent with the purposes and requirements of applicable federal laws.

266. See the responses to comments 196 and 269.

267. No studies have been conducted in the Clark Fork Basin to determine, on a site-specific basis, historical return flow rates. The modeling assumptions in the draft EIS are based on theory, literature reviews, sensitivity analyses, and interagency communication (with the U.S. Bureau of Reclamation and U.S. Army Corps of Engineers).

Reports from MSU (1988) and Cunningham, Bultsma, and Boyce (1988) indicate that the techniques used to estimate return flow rates in the draft EIS were reasonably accurate.

268. The Flint Creek simulation model was based on numerous components; the limited historic streamflow measurements near the mouth (USGS gauging station 12331500) were only one element of the overall effort. Data on irrigated lands were based on a variety of sources including the SCS, USGS, DNRC's Missoula water rights field office, and input from people who know how irrigation operates in the basin. Techniques used to address the hydrologic and agricultural aspects of water supply and demand in the draft EIS are commonly applied by hydrologists familiar with modeling. DNRC has applied the same general computational techniques and similar databases to other studies where detailed verification was available and found the method reliable. Thus, even without extensive verification (something that very few basin models have), the Flint Creek model can be expected to reasonably reflect water supply and demand.

269 15. The DEIS should include some discussion of a monitoring plan for protecting in-stream reservations.

269. No monitoring plan was formally proposed by DFWP. However, DFWP has described how reservations could possibly be monitored in the upper Clark Fork basin (Spence 1987). See also the response to 192 and gauge locations as shown in Figure 2-1 on page 7 of the draft EIS.

"Implementation of a monitoring/enforcement program on the Clark Fork will be an evolutionary process. The timing and degree to which we monitor individual streams will depend on the extent of junior water use on those streams. Streams with the most junior users will be monitored more immediately than those with fewer junior users. As the number of junior users increases and the total effects of those new diversions become more apparent, our monitoring program would be expanded.

The Clark Fork River main stem would probably be monitored from the beginning. There are currently four USGS gauges on the upper Clark Fork main stem and one each on Flint Creek, Warm Springs Creek, and Little Blackfoot River. As you are aware, none of these are automated remote gauges. However, they could be modified for automation as needed.

Each of the four Clark Fork reaches contains one stream gauge. Flows by reach could, therefore, be monitored with the appropriate gauge. We would also look at the possibility of moving a gauge to another location or reactivating a discontinued gauge if we find it appropriate to do so.

For tributary streams without gauges, we would likely monitor flows at the nearest Clark Fork or tributary gauge which is below the confluence of that ungauged tributary. Junior users in all tributary streams above the respective gauge would be notified if the granted flows are not being met at the gauge. Remember, the reservations will not make more water available, they will only preserve an existing situation. This existing situation begins on the date the reservations' priority date is established by the Board. We protect (reserved) flows from those junior users who are issued permits after that date. Senior water users are not affected and the reservations, of course, cannot control natural flow levels which may occur below the granted reservation amounts. By shutting off junior users only, we protect the streamflows at whatever level they may occur below the reservations, even without gauging each stream.

(response 269, continued)
There is, however, one obvious problem with this approach. If there are junior users on an ungauged tributary, flows in portions of that stream could be depleted without affecting the flows at the gauge site which monitors that tributary. However, the solution to this problem relates to our original statement regarding instream flow protection—it is an evolutionary process. Consequently, we likely would begin to monitor flows on that tributary when there are a sufficient number of junior permits to have an effect on the flow. Otherwise, if there is little possibility of the junior users affecting a given tributary's flow, we would monitor the flow at a downstream site.

We have experience in protecting our instream reservations in the Yellowstone Basin. Monitoring of stream flows is done at established USGS sites in the basin. When streamflows drop below the reservations, junior water permit holders are notified by letter that they must cease their diversions. DNRC has authority to enforce compliance by junior permit holders. We would follow the established DNRC procedures to obtain compliance by those junior users in the Clark Fork basin.

The approximate current costs for installation and operation of various types of stream-gauging equipment are shown on the attached table. "Real time" installations operated via satellite are most expensive and may not be required in most cases. Daily stage heights during the low flow periods could be obtained with something as simple as a staff gauge, or wire weight gauge, read by an observer and reported by phone on a daily basis. One remote gauge may be useful on the main stem Clark Fork (perhaps at the Turah site) during the initial stage of our monitoring/enforcement program.

Finally, we have some comments concerning monitoring/ enforcement requirements.

Once reservations are granted, it becomes the responsibility of DFWP to protect those reservations. How, when, and where we do this depends on several factors.

(1) Need. How many junior water users are there to protect against?
(2) DFWP funds available. Funding levels may vary. Our ability to contract with USGS will depend upon availability of these funds following granting of the reservations.

Thanks for the opportunity to comment. We hope the final EIS and recommendation by the board reflect our position to grant the
270 reservations as requested, not subordinate the reservations to other consumptive uses and hold hearings on the final recommendation. We'd appreciate a response to our comments.

Sincerely,

Bruce Farling
Staff Researcher

cc.
DFWP

(response 269, continued)
(3) USGS funds available. Federal funding levels (USGS matching money) are uncertain due to budget reduction efforts by the federal government. Our ability to contract with USGS will depend on its level of funding in the years/decades following granting of the reservations.

We believe DFWP is in the best position to determine the extent of a monitoring/enforcement program for granted instream reservations and we will proceed in a manner similar to what has evolved in the Yellowstone Basin."

Table 4-10
1987 Installation and Operation Costs of Stream Gauge Options[a]

Type of Equipment	Installation	Annual Operation
Staff gauge	$500	$6,000
Wire weight gauge	1,200	6,000
Standard gauge house & equipment (float type or manometer)	11,000	6,000
LARC automated remote system (telephone)	2,800 +hookup[b]	6,000
"Real Time" (satellite)	5,500	6,000 + 1,200[c]

a Assumes all work done by USGS.
NOTE: If a satellite system were to be installed in a new standard gauge house, the total installation cost would be $11,000 + $5,500 = $16,500.
b Hook-up cost varies with distance from the gauge site to an existing telephone line.
c $1,200 is an extra charge (over and above the normal $6,000 annual operating charge) if the cooperator desires maintenance service within 48 hours of a unit breakdown.

Source: Spence 1987

270. Your recommendation is noted. By its inclusion in this final EIS, your recommendation will be part of the legal record presented to the Board.

RECEIVED
FEB 15 1989
MONT. DEPT. of NATURAL RESOURCES & CONSERVATION

Donna and Marlis Gilmer
Box 32
Garrison, Montana 59731

Mr. John Tubbs
Montana Dept of Natural Resources
and Conservation
1520 E. 6th
Helena, Montana
59620-2301

Mr. John tubbs,

I, would like to place our objections to the applications of the Fish, Wildlife, and Parks Water Reservations of the Upper Clark Fork River.

271 We object to the amount of land they claim is being irrigated by the Upper Clark Fork Basin, as it is ~~this~~ extremely inaccurate.

We object to the water reservation application as well, for Warm Spring Creek township 9N Range 10W, as it is extremely inaccurate on the amount of irrigated agricultural ground.

We object entirely to the Reservation application of the Fish, Wildlife, & Parks, of the Upper Clark Fork River Basin and its tributaries.

271. See the responses to comments 212 and 217.

Washington Water Power
1889-1989

Fred A. Shlosaki
Manager
Environment, Safety and Health

February 13, 1989

Mr. John Tubbs
Department of Natural Resources and Conservation
Water Resources Division
1520 East Sixth Avenue
Helena, MT 59620-2301

RE: Clark Fork Reservations, Draft Environmental Impact Statement (DEIS)

Dear Mr. Tubbs:

The Washington Water Power Company (WWP) owns and operates the Noxon Rapids hydroelectric development located at river mile 170 on the Clark Fork near the town of Noxon in western Sanders County, Montana. This facility is Federally licensed as Project No. 2075 which license is administered by the Federal Energy Regulatory Commission (FERC).

As the DEIS confirms, the water rights associated with the Noxon Rapids Project are substantial (DEIS page 15). The WWP first posted a claim for 35,000 cfs of water in 1951. When the project began operation in 1959, an additional 5,400 cfs was put to beneficial use. These water rights and the associated reservoir storage rights have been claimed by WWP in Montana's state-wide water rights adjudication now in progress. A Temporary Preliminary Decree for these claims was issued in 1986. The WWP also holds a 1976 water use permit acquired at the time additional generating capacity was installed.

272

The 50,000 cfs hydraulic capacity of the Noxon Rapids Project is sufficient to use the full flow represented by WWP's claimed and permitted rights to water. The comments which follow represent WWP's concerns with respect to the influence the proposed water reservations in the upper Clark Fork River may have upon WWP's exercise of these rights.

MDFWP's RESERVATION REQUESTS

The WWP will not be adversely affected by the instream reservation request of the Montana Department of Fish, Wildlife, and Parks (MDFWP). Circumstances have largely dictated the need for MDFWP's efforts to more reliably secure instream flows on behalf of the resource interests the agency represents. New permits for consumptive water may now be depleting instream flows (DEIS page ii, 14, 15, and 18).

273

The Washington Water Power Company P.O. Box 3727 Spokane, Washington 99220 (509) 489-0500 / 1-800-727-9197
SERVING EASTERN WASHINGTON AND NORTHERN IDAHO WITH ELECTRICITY AND NATURAL GAS

272. Comment noted.

273. Comment noted.

MDFWP's concerns were reinforced by DNRC's past attempts to subordinate senior non-consumptive water rights associated with hydroelectric facilities (DEIS page 58). Such efforts by DNRC would appear to be in conflict with state constitutional protection of property rights. Nonetheless, the uncertainty created by the prospect of future subordination of major non-consumptive water rights, combined with the increasing depletions brought on by new water use permits, warrant MDFWP's concern for instream flows throughout the basin. 274

GCD's RESERVATION REQUEST

The best information now available suggests WWP is likely to be adversely affected by the consumptive reservation request of the Granite Conservation District (GCD). As the DEIS concludes, WWP presently has the legal right to 50,000 cfs of water in the Clark Fork River (page 18). Further, "Flows greater than 50,000 cfs are available only during spring runoff, and then only in some years." (DEIS page ii and Chapter 3). The analysis presented in the DEIS has not accounted for water rights other than WWP's, including irrigation rights and Federal and Tribal reserve rights, which may have a profound effect upon the legal availability of water. 275

At DNRC's request, researchers at Montana State University have studied and reported the "Effects of Future Irrigation Development on Hydroelectric Generation in the Clark Fork River Basin." The November, 1988 evaluation considered the influence additional withdrawals of water would have upon the 1980 level of hydro development in the basin, taking return flows into account. Under all combinations of sprinkler and flood irrigation modeled, electric generation at the Noxon Rapids Project was always inversely related to additional irrigation withdrawals (i.e., more depletions cause less generation - an adverse effect). 276

The WWP's preliminary calculations suggest the value of power foregone may be underestimated in the DEIS (page 79). Also, according to the Governor's report on the Clark Fork, the value of generation is $3 to $5 per acre-foot of water at the Noxon Rapids Project alone and roughly $60 per acre-foot to the region (See page 2-17 of the "Clark Fork Basin Project Status Report and Action Plan" prepared by H. E. Johnson and C. L. Schmidt, December, 1988). At these reported values and assuming no measurable return flow, the annual value of power foregone to the 4,950 acre-feet of storage proposed (DEIS page 10) could be nearly $15,000 at Noxon and about $300,000 to the region. 277

A reservation for consumptive water use constrained to some spring runoff seasons may avoid the adverse impacts of reduced generation to WWP. However, this may not avoid impacts when other existing water users within the basin are considered. In any case, water would clearly not be available the eight in ten years needed for irrigation project feasibility (DEIS page 51). Moreover, since the development for which the reservation request is based "was not found to be economically feasible" (DEIS page 78), the required constraints on water availability can only further reduce the economic benefits. 278

Several possible strategies were identified which might overcome the water availability issue. Since each strategy relies on inherently unforeseeable actions (DEIS page 14) and requires existing (constitutionally protected) property rights be affected, these prospects offer little substance on which to render a decision at this time. 279

274. Each nonfederal hydroelectric dam is licensed to operate by the Federal Energy Regulatory Commission (FERC) which can subordinate hydropower use to other water uses within the state. As long as FERC has this authority, it is possible that the instream flows relied upon by hydropower producers could be depleted by upstream consumptive uses. Instream water reservations granted to DFWP would protect at least some of these instream flows in critical areas, such as food-producing riffles and spawning beds. As a water management agency, DNRC has a responsibility to assess the advantages and disadvantages of subordination prior to any relicensing proceeding.

275. Federal reserved water rights were discussed on pages 13 and 14 of the draft EIS. Once the nature and extent of these rights are determined, they could pose serious constraints to water availability. Existing irrigation water rights may also constrain water availability during the irrigation season.

276. The MSU study did not analyze the effects of additional storage as proposed by GCD. In the draft EIS, it was noted that annual power production at WWP's Noxon Rapids facility would be reduced if GCD's proposed project on the North Fork of Lower Willow Creek was constructed. See Chapter Three of this final EIS for more information on the effects of GCD's proposed projects on hydropower production.

277. The values per acre-foot cited in the comment are consistent with those used by DNRC. DNRC's analysis of the North Fork of Lower Willow Creek project did take return flows into account. See Chapter Three of this final EIS.

Since the draft EIS was published, DNRC has revised its estimates of stareamflows and therefore on the effects of GCD's proposed projects on downstream hydropower generation. See Chapter Three of this final EIS.

278. GCD's proposed project is ecoanomically infeasible even if downstream water rights do not reduce legal water availability.

279. The strategies that are referred to are discussed in greater detail on pages 57 and 58 of the draft EIS. In this discussion, the steps that would need to be taken for each of the four strategies to be successful are presented. Each strategy requires specific action from either a federal agency or the U.S. Congress and therefore the outcome is uncertain. However, these strategies could be successful.

The available information confirms the GCD request cannot be granted without either adversely affecting existing water rights or further reducing the already limited economic benefits of the proposal (DEIS page 93). Also, the reservation does not appear to be needed since acquisition of existing water rights by GCD from voluntary sellers is a reasonable alternative (DEIS page 75). Considering the above, denial of the reservation request appears to be the appropriate recommendation DNRC should present to the Board of Natural Resources and Conservation.

280

MISCELLANEOUS COMMENTS

The DEIS correctly states WWP has not objected to new permits in the Clark Fork River basin. Importantly, this is a fact no less true for many thousands of other claimants of Clark Fork waters. The claims of *all* water users which are sustained by decrees in the adjudication process will remain senior and fully enforceable over permits issued by DNRC since 1973, whether or not objections to permit applications were filed. The obligation to demonstrate that unappropriated waters are available for a new proposed use lies entirely with the proponent for a new permit at the time of application. This applicant responsibility exists whether or not DNRC insists upon strict substantiation of water availability at the time of application for the water use permit. Permits so issued are, by statute, provisional and subject to later modification, depending upon the amount of water determined to be available by the adjudication.

281

The DEIS (page 42) discussion of the economic role of the Clark Fork does not fully describe the primary and secondary benefits hydroelectric developments bring to Montana and the region. Hydro projects provide a substantial tax base, recreational values, local payrolls, and a coordinated, renewable energy system which is responsive to the variable energy demands of the public. To the extent such considerations bear upon the recommendations DNRC must make, reference should be made to the above-referenced Governor's Task Force report beginning at page 2-11.

282

280. Your recommendation is noted. By its inclusion in this final EIS, your recommendation will be part of the legal record presented to the Board. Purchasing existing rights is possible, but there may be no willing sellers.

281. Comment noted. See the responses to comments 409 and 410.

282. The Governor's Task Force Report referred to in the comment is the Clark Fork Basin Project Status Report and Action Plan, issued by the Montana Governor's Office in December 1988. The report concludes that stream flows in Montana are an important contributor to the regional hydropower system of the Columbia River basin. The report contains a quote from the Northwest Power Planning Council extolling the economic benefits of hydroelectric generation: "For more than a half century, electrical power has been the cornerstone of the Pacific Northwest economy." The report indicates that low-cost hydroelectricity has been a significant factor in encouraging industry to locate in the Northwest. The report also cites local economic benefits resulting from employment and dollars spent in the operation and maintenance of the hydroelectric facilities, property tax benefits to local taxing jurisdictions, and benefits associated with irrigation, navigation, flood control, and diverse recreation (Montana Office of the Governor 1988).

The report indicates that a surplus of electrical generation capacity exists in the region, and that this is predicted to change in the early 1990s when demand for electricity will exceed the region's generation capacity.

The hydropower dams do make a significant contribution to the property tax bases of the western Montana counties in which they are located. Only the Milltown and Flint Creek dams are physically located in the upper Clark Fork basin. Local property taxes paid by the Milltown Dam benefit Missoula County school districts and Missoula County government. The Flint Creek Dam is located in Deer Lodge County and represents 0.2 percent of the county's taxable value. Dam-related facilities in Granite County are 0.2 percent of that county's taxable value (Whittinghill 1990).

283

Some corrections should be noted with respect to the Noxon Rapids Project (DEIS page 20). The WWP currently operates this facility within four feet of full pool between May 15 and October 1 to protect recreational access and fish spawning and rearing habitat. Drawdowns are restricted to ten feet the remainder of the year for fish, except under critical water conditions. A daily constraint of two feet is maintained for shoreline erosion control.

The WWP trusts these comments are useful to DNRC in its final analysis of the requested reservations of water from the Clark Fork River.

Sincerely,

Fred A. Shiosaki

Fred A. Shiosaki

(response 282, continued)

The operation of the Thompson Falls and Noxon Rapids dams also relies on flows from the upper Clark Fork basin. In Sanders County, the taxable valuation of WWP's Noxon Rapids Dam and MPC's Thompson Falls Dam and related transmission facilities account for about two-thirds of the county's total taxable valuation (Montana Department of Revenue 1988).

Direct employment in operation of the hydroelectric facilities is not a major portion of total employment in any of the counties potentially affected by the reservation. The largest dam, at Noxon Rapids, employs 12 people (Woodworth 1987).

The MPC dams do provide a small increment of the total electricity consumed by its Montana customers. The low-cost electricity produced at the Thompson Falls and Milltown dams contributes to lower electric rates for Montana consumers, benefiting businesses and individual residents of the state, as well as the state's overall economy. Nearly all of WWP's electrical generation is exported out of state. The low-cost electricity produced at the Noxon Rapids Dam benefits local economies in Washington and Idaho and the overall regional economy.

The hydroelectric projects do enhance flatwater recreation along the Clark Fork main stem. The backwater above Noxon Rapids Dam creates flatwater boating and fishing opportunities. The Milltown and Thompson Falls dams have less of an effect on flatwater recreation because they are run-of-the-river dams.

283. The corrections are noted.

4741 Sundown Rd.
Missoula, MT 59801

Feb. 26, 1989.

John Tubbs
Water Resources Division
Dept. of Natural Resources and Conservation
1520 East Sixth Ave.
Helena, MT 59620

Dear Mr. Tubbs,

We have had the opportunity to study the Clark Fork Coalition's comment of Feb. 7 to you on the Draft EIS for Water Reservation Applications in the Upper Clark Fork Basin. 284

We strongly support their observations, comments and questions.

Sincerely,

Alice H. Austin

Alice H. Austin

Briggs M. Austin

284. Comment noted.

Feb. 24, 1989

RECEIVED
MAR 0 1 1989
MONT. DEPT. of NATURAL RESOURCES & CONSERVATION

Johny Tubbs

I am objecting to the recent water reservation application filed by the Dept. of Fish, Wildlife & Parks on the Upper Clark Fork river.

I think this water should be preserved for agricultural development in the Clark Fork drainage.

I would like to see the Dept of F.W.P. develop off stream storage to be released in the critical months of the summer for instream flow for the survival of the fish.

The Dept. of F.W.P. and Nature Conservancy found approx. 1.4 million dollars for Elk habitat by purchasing the Freyer ranch north of Ovando Mt.

I would like to see the same efforts put forth for the survival of the fish.

I also want to thank the Dept of Natural Resources & Conservation for the 30 day extension to file our objections.

Rancher - Kenneth P. Flemming
1021 Dempsey Lake Rd.
Deer Lodge, Mt.
59722

285

285. Comment noted. See response to comment 33 for a discussion of storage as it relates to DFWP's requested reservations. A number of private and nonprofit groups, such as Trout Unlimited and the Anaconda Sportsmen's Club, do help fund projects that benefit fish. These groups cannot apply for a reservation, nor can they buy existing consumptive water rights and change them to instream flow use (unless storage is purchased). The State Water Plan is examining ways to encourage water users to cooperate in the construction of storage.

COUNTY OF POWELL

DEER LODGE, MONT.

March 8, 1989

Mr. John Tubbs
Clark Fork Reservations
Dept. of Natural Resources & Conservation
Water Resources Division
1520 East Sixth Ave.
Helena, Montana 59620-2301

Dear Mr. Tubbs:

We, as the Board of Powell County Commissioners, are objecting to the Environmental Impact Statement for water reservation applications in the Upper Clark Fork Basin.

286

We do not believe this study truly reflects the importance and value of agriculture in the Deer Lodge Valley, in which water plays such an important role.

The number of irrigated acres on Race Track and Dempsey creek are grossly inaccurate, and only reflect a small percentage of the actual irrigated acres on these streams. This study seems to be slanted toward recreation and does not address the importance of water usage in the agricultural sector. There was no mention of future agricultural expansion in the county, which Clark Fork River water would play such an important part.

287

We would like to see this Impact Statement overhauled and address the impact on the agricultural community if the reservation on the Clark Fork were granted to the Dept. of F. W. P.

288

We would like to thank you in advance for any consideration given us in opposition to the Environmental Impact Statement, and also the thirty day extension for filing our objection.

Sincerely,

POWELL COUNTY BOARD OF COMMISSIONERS

Kenneth Fleming, Chairman

Earl Knight, Member

Don Valiton, Member

286. See the response to comment 37(b).

287. See the response to comment 217.

288. See the response to comment 37(b). See also pages 42, 62, and 63 of the draft EIS for discussions of the agricultural sector of Granite County's economy. A description of how DFWP's reservations, if granted, would impact agriculture can be found on pages 54 and 55 of the draft EIS.

TROUT UNLIMITED

MADISON - GALLATIN CHAPTER

MAR 13 1989

Mr. John Tubbs
Water Resources Division
DNRC
1520 East Sixth Avenue
Helena, Montana 59620

Dear Mr. Tubbs,

Our brief review of the DEIS on Upper Clark Fork Water Reservation Applications indicates that the DFWP application meets all the required criteria and that your agency therefore should recommend approval of that request for instream flows. 289

The aquatic life of the Upper Clark Fork has taken a fearsome beating from the heavy metals and other pollutants generated by mining activity over many years. Given the condition of our national budget, superfunding seems unlikely to be appropriated for Clark Fork cleanup in the foreseeable future. Maintenance of current flow conditions is the only means by which the river's fisheries have any chance to reach even a fraction of their potential to provide the quality of recreation that can significantly enhance the basin's economy. While dilution flows are not the proper means of handling pollution problems, it appears to be the only solution available for the Clark Fork. 290

Even absent the river's current pollution levels, DFWP's request should be granted simply to protect the existing aquatic life. The very junior priority of the reservations will not improve the habitat, but it will prevent the deterioration of what could be a genuinely first class fishery. And water rights now in place will never be harmed by the reservations. Both public and private interests will be well served by granting them. 291

P.O. Box 52 • Bozeman, Montana 59715

289. Your recommendation is noted. By its inclusion in this final EIS, your recommendation will be part of the legal record presented to the Board.

290. For a discussion of the Superfund cleanup effort, see the responses to comments 54, 55, and 63, and Chapter Three of this final EIS. The flows requested to dilute pollutants would be reserved only until mine wastes entering the Clark Fork are cleaned up. If the cleanup is successful, these flows would be available for appropriation and could be put to other uses. Meanwhile, the Superfund cleanup and other Clark Fork improvement efforts are needed to enhance the fishery. DFWP's requested reservations would only maintain existing conditions.

291. Your recommendation is noted. By its inclusion in this final EIS, your recommendation will be part of the legal record presented to the Board.

We would make one brief comment on the Granite CD application. On page 11 under "Public Interest," the EIS states that GCD claims a 1.8 benefit to cost ratio for project water users, but that it expects state and federal assistance would increase that to "4.4 times GCD's share of project costs". This suggests
292 that GCD perceives cost/benefit ratios to be based only on the cost to the recipients of the benefits rather than the full actual cost of the project. In other words public money (subsidy) isn't money. We do not feel that's either an accurate or a proper way to determine whether the cost benefit ratio meets the public interest criteria.

293 The Madison/Gallatin Chapter of Trout Unlimited urges DNRC to recommend approval of DFWP's instream flow reservation application in the Final EIS.

Sincerely,

Jim Belsey, for
Board of Directors

292. The ratio of project benefits to GCD's share of project costs after state and federal subsidies are not a factor in determining the benefit-cost ratio. GCD did apply the term "benefit-cost ratio" to these figures in its application, but DNRC was careful not to use this term in the paragraph under Public Interest on page 11 of the draft EIS. The benefit-cost ratio necessarily includes other costs, such as decreases in the quality of fisheries and water quality. These costs are summarized on page 11 and examined in more detail in Chapter Six of the draft EIS.

293. Your recommendation is noted. By its inclusion in this final EIS, your recommendation will be part of the legal record presented to the Board.

MONTANA STATE UNIVERSITY | Extension Service
Powell County Extension Office
409 Missouri (Courthouse)
Deer Lodge, Montana 59722
406-846-3680 Ext. 19

MAR 13 1989

March 10, 1989

Mr. John Tubbs
DNRC Water Resources Division
1520 East Sixth Ave.
Helena, MT 59620-2301

Dear John:

After reviewing the draft EIS for the Upper Clark Fork Basin water reservation, I have a number of concerns which I would like to express.

294 The water adjudication process in the State of Montana for Basin 76G is still in process. It appears that if the in-stream flow reservation for Fish, Wildlife and Parks was granted prior to a final decree of the existing water rights it would "muddy the water" extremely. We need to deal with one major issue at a time in order to make wise decisions as they relate to this precious natural resource we have in Montana called water.

295 I would recommend that the reservation be tabled until the adjudication process is final.

Sincerely,

David J. Streufert
MSU/Powell County Extension Agent

DJS/srf

294. If granted, DFWP's reservations would add another nonconsumptive water use in the upper Clark Fork basin. DFWP's priority date would be later than that of those who now legally use water. DFWP's reservations would be no different than granting a provisional water use permit to an irrigator or industrial water user. DNRC continues to grant such permits while the adjudication progresses. See the response to comment 252 for a discussion of the adjudication process as it relates to the reservation applications.

295. Comment noted. DNRC is legally obligated to process all reservation applications, regardless of the status of the adjudication.

Box 366
Avon, MT 59713
March 13, 1989

RECEIVED
MAR 14 1989
MONT. DEPT. of NATURAL RESOURCES & CONSERVATION

Dept. of Natural Resourses
1520 East Sixth Ave.
Helena, MT 59601

Attention: John Tubbs

Dear Mr. Tubbs:

This letter is in regard to the instream flow being initiated by the Montana State Fish And Game on the Clark Fork River and its tributaries.

296 I am very much opposed to this action. After living here all of my life and having irrigated from these waters, it is my firm belief that the ranchers and farmers using these waters for irrigation are not hindering the stream flow. Instead, they are aiding the stream flow by keeping the water table up with their present irrigation methods.

297 I also feel that the acreage under irriggtion stated by the Fish and Game Department is erroneous as it is actually a far higher number.

298 I therefore object to this instream flow on the Clark Fork River and its tributaries by the Fish and Game Department.

Thank you for your consideration on this matter.

Sincerely,

John P. Senecal

296. Existing irrigation recharges local aquifers, which in turn supply return flows to streams in the late summer and fall. However, less water returns to the stream than is diverted because of consumptive crop use, evaporation, and losses to aquifer systems that do not recharge stream flows. Furthermore, while late season return flows do add water to the streams, this addition may not offset the amount of water being diverted for late season irrigation.

DFWP's requested reservations would not affect the way in which the use of existing water rights influences aquifer recharge and return flows.

297. See the response to comment 217.

298. Your recommendation is noted. By its inclusion in this final EIS, your recommendation will be part of the legal record presented to the Board.

GRANITE CONSERVATION DISTRICT - Philipsburg, Montana 59858

RECEIVED
MAR 15 1989
MONT. DEPT. of NATURAL RESOURCES & CONSERVATION

John Tubbs
re: Clark Fork Reservations
DNRC
Water Resources Division
1520 East Sixth Ave.
Helena, Mt. 59620-2301

Dear Mr. Tubbs:

299 The Granite Conservation District believes that the economic consequences of these reservation applications have not been thoroughly addressed. Is there any negative economic response to FW&P application, ie. restrictions on future development?

300 DNRC, in paragraph four of the summary, states that instream flow reservation would not cause additional impacts to the environment. Please define environment - does this include economic environment?

301 If a reservation is granted please explain legalities of administering. Water rights disputes are handled by a district court. A reservation is not a water right as stated by the DNRC. Is a reservation within the jurisdiction of the district court. If so, please site the law. Also please clarify the issue of who can demand a water commissioner.

302 It is stated in the DEIS that instream flow would help protect existing water rights. Explain how this might occur.

303 Granite Conservation District believes costs of building its project have been far overstated in the DEIS. During the completion of its application for reserved water, Granite Conservation District was told by the DNRC to avoid speculation. It appears that DNRC has done considerable speculation in writing its DEIS.

304 DFW&P claims instream flow would benefit fish. Please explain what species, how many etc. The supposition seems to be that more water means more fish. Are we talking about suckers, arctic grayling - what!

Granite Conservation District would like to object to DNRC methodology of determining irrigation needs, production potential, and irrigation efficiency.

305 A. Irrigation needs - A quick look at DNRC'S input into the readjudication process should explain this objection. It appears to the board that DNRC does not fully understand the actual in field operation of an irrigation system. They seems to operate from a textbook format.

299. DFWP's proposed reservation could impose costs on other parties by making future industrial, mining, agricultural, and residential development more expensive or impossible. This is addressed on pages 75 and 76 of the draft EIS.

300. The sentence in question refers to the physical environment.

301. As described on page 2 of the draft EIS, a reservation is a water right (§ 85-2-102(1)(b), 85-2-316, MCA), and the same causes of action and remedies available to other water right holders are also available to holders of water reservations. See the response to comment 128 for a discussion of the water commissioner issue.

302. See the response to comment 76.

303. See Appendix E in the draft EIS for a full explanation of DNRC's cost estimates. The figures have been rechecked and were found to be accurate. See also the response to comment 36.

304. Table C-1 on page 145 of the draft EIS describes the fish species present in each stream where reservations are requested. Population estimates for game fish are presented. Population estimates of roughfish such as suckers are seldom made.

DFWP's requested instream flow reservations would not make more water appear in a stream, but would maintain existing flow conditions.

305. DNRC accepted and used GCD's figures for crop irrigation requirements and efficiency. This is the only "methodology of determining irrigation needs" that was used in preparing the draft EIS. See the response to comment 306 for a discussion on production potential.

306 B. Production potential - Has DNRC done any on-sight studies of production potential on irrigated lands within the Flint Creek Basin? Granite Conservation District's findings are far different that what DNRC maintains.

306. The time frame of the reservation process does not allow a statistically valid study of the long-run yield potential of the project lands. Such a study would require recording yields, inputs such as fertilizer, and farming practices such as time of cutting, from a sample of fields over several years. Earlier drafts of the GCD application indicate that GCD's estimate of 4.7 tons/acre yield on average was the result of weighing a sample of bales from an irrigated hay field in the Boulder Creek project area farmed by Gary Metzner. GCD did not provide any information on how bales were selected or how many were in the sample. Without this information, DNRC could not evaluate the accuracy of the sampling or the statistical precision of the result. GCD also did not provide any information about the farming practices that would be used on the project land. Mr. Metzner's reported yield of 4.7 tons/acre is within the range of yields possible in the project area, but is a level reached only by a few producers using intensive management (Ditterline 1989).

GCD's enterprise costs were an average of costs from a high cost, intensive management operation and a low cost, less intensive management operation. From this, DNRC concluded that an average level of both costs and yields would be appropriate. DNRC examined the published results of controlled studies of the response of alfalfa yields to water availability. These results were pooled to produce the alfalfa yield equation used by DNRC (see Dodds 1988). With potential evapotranspiration given by Drummond airport weather data, DNRC's yield function gives an average full-service yield of established alfalfa of 2.73 tons per acre. Table 4-11 presents average Granite County irrigated alfalfa yields and the highest county average yield in Montana reported in Montana Agricultural Statistics. The average Granite County yield from 1980 through 1986 is 2.6 tons per acre. GCD's yield projection is over 1.5 tons higher than the highest reported Granite County average and is higher than the highest average yield reported for any county in the state.

C. Irrigation efficiency - Granite Conservation District feels that DNRC does not understand local irrigation systems? Apparent irrigation inefficiency makes possible a very efficient and workable irrigation system within Granite County. Water in Granite County is highly controlled and highly used, yet we have outstanding fishing and recreational opportunities. It is hard to imagine changing the use of any significant amount of water without adversely affecting someone. We see the only potential for improving water availability in Granite County as being the introduction of new water from another basin of storage of high flows during spring and early summer months.

307

Sincerely,

Jim Dinsmore Pres

Jim Dinsmore - Chairman
Granite Conservation District

(response 306, continued)

Table 4-11
Alfalfa Yields T/A

Year	Granite County Average Yield	Highest County Average in State
1986	2.40	3.78
1985	1.70	3.40
1984	2.82	4.00
1983	3.09	4.25
1982	3.20	4.55
1981	2.82	4.32
1980	2.48	3.98

Source: Montana Department of Agriculture. 1989.

DNRC informed GCD at a meeting on February 8, 1988, in Philipsburg that its yield projection was inconsistent with evidence on alfalfa yields found by DNRC and that DNRC would not use it unless GCD's claims could be documented and shown to be a valid projection of average yields on project lands. GCD did not provide DNRC with any additional information.

307. DNRC used the irrigation efficiency levels provided in GCD's application. See also the response to comment 149.

RECEIVED
MAR 15 1989
MONT. DEPT. of NATURAL RESOURCES & CONSERVATION

Mar 13, 1989
382 Burnt Hills
Deer Lodge, Mt.

To whom it may concern:
we the undersigned object to the
308 Environmental Impact Statement of the
upper Clark Fork Basin
Because we feel it is inaccurate,
Because it gives the Dept of Fish
Wildlife & Parks legal standing to
309 object to new permits & changes in
water rights.

Henry J Schiele
Gloria J Schiele

308. See the response to comment 212.

309. The draft EIS itself does not give DFWP legal standing to object. DFWP would gain legal standing to object to new water use permits or to changes in existing rights only if the Board grants DFWP an instream flow reservation.

Deer Lodge Valley Conservation District
91 North Frontage Road - Deer Lodge, Montana 59722 - Phone (406) 846-1703

March 14, 1989

John Tubbs
Dept. of Natural Resources and Conservation
Water Resources Division
1520 East Sixth Avenue
Helena, Mt 59620-2301

Dear John,

I would like to take the opportunity to register my objection to the Clark Fork Reservations and its Draft Environmental Impact Statement.

310 I belive that the tributaries of the Clark Fork are already over appropriated, therefore there would be little change in the amount of water left for instream flow.

311 I believe the main Clark Fork is also already over appropriated. 312 The water quality of the Clark Fork is not adequate for fisheries and instream flow of the 313 Clark Fork is better used for industry and agriculture. That is where its true value lies.

I also object to the Environmental Impact Statement because it was written on the basis of old and out dated 314 information and incomplete data. On such basis a fair interpretation of the situation is not possible.

It is on this basis I register my objection.

Sincerely,

Jack Perkins by CW
Jack Perkins

CONSERVATION DEVELOPMENT SELF GOVERNMENT

310. Many streams in the upper Clark Fork basin are heavily appropriated. However, water for instream flow is available on most tributaries at least part of the year because appropriators do not use the water all of the time, nor all at the same time. Water availability in the upper Clark Fork basin is discussed in more detail in Chapter Three of this final EIS and in response to comments 103, 124, 130, and 133.

311. See responses to comments 85, 124, 130, and 133.

312. Water quality in the Clark Fork has dramatically improved since the 1970s and the river now supports at least limited numbers of trout and other sport fish (see Table C-1 on page 144 of the draft EIS). Directly downstream from the Warm Springs ponds the Clark Fork supports about 3,000 fish per mile. The Superfund cleanup effort and subsequent improvement of water quality could increase the viability of the upper Clark Fork fisheries.

313. Industry, agriculture, fish and wildlife, and recreation are all recognized as beneficial uses under state law (§ 85-2-102(2)(a), MCA). In the draft EIS, DNRC examined each of these uses in the upper Clark Fork basin.

314. See the response to comment 212.

GEORGE GRANT CHAPTER
P.O. Box 563
Butte, Montana 59703

RECEIVED
MAR 17 1989
MONT. DEPT. of NATURAL RESOURCES & CONSERVATION

March 15, 1989

John Tubbs
Department of Natural Resources and Conservation
Water Resources Division
1520 East Sixth Avenue
Helena, MT 59620-2301

RE: Clark Fork Reservations

Dear John:

315 The George Grant Chapter of Trout Unlimited wholeheartedly supports the instream flow reservation requested by the Montana Department of Fish, Wildlife and Parks (DFWP) in the tributaries and mainstem of the Clark Fork of the Columbia River above Milltown. We urge

316 the Department of Natural Resources and Conservation to recommend granting the complete appropriation documented by DFWP either in the final EIS or as a separate document submitted to the Board of Natural Resources and Conservation. Finally, we implore the board

317 to grant the full instream flow reservation requested by DFWP to protect fish, wildlife, recreational resources and water quality in the basin where we live.

The Draft Environmental Impact Statement provides proof that DFWP's request completely meets the terms of the Montana Water Use Act:

Purpose
The purpose of the reservation; the protection of fish, wildlife, recreation, water quality and investments made in pollution abatement in the basin, will provide indisputable long-term public benefits.

Need
As anglers we have been alternatively enthused by the recovery of

318 the Clark Fork below the Warm Springs Ponds and disgusted by the recurrent summer fishkills there. The Clark Fork has a crying need for pure flows to reverse a century of water quality abuse.

Amount
DFWP has adopted a proven methodology, the Wetted Perimeter Inflection Point method, for documenting the amount of flow needed in riffle areas for the survival of aquatic organisms and calculated the flows needed to dilute pollutants during low-flow periods in the winter.

Public Interest
The benefits enumerated by the DNRC exactly parallel the purposes why we belong to Trout Unlimited. Through continued perpetuation of the cold water fisheries and the nurturing of a healthy aquatic environment in this abused river valley we will guarantee the greatest possible public benefits.

Sincerely,

R. V. Tilman
President

315-317. Your recommendations are noted. By their inclusion in this final EIS, your recommendations will be part of the legal record presented to the Board.

318. Comment noted. The Board will examine DFWP's application in light of the decision criteria set out in the Administrative Rules of Montana (see Chapter Two of this final EIS).

RECEIVED

MAR 17 198

MONT. DEPT. of NAT. RESOURCES & CONS.

John Vanisko
1311 Bowman Rd.
Deer Lodge, MT 59722

March 13, 1989

Mr. John Tubbs
RE: Clark Fork Reservations
Department of Natural Resources
and Conservation
Water Resources Division
1520 E. Sixth Avenue
Helena, MT 59620-2301

Dear Mr. Tubbs:

Pursuant to the Draft Environmental Statement prepared by the Department of Natural Resources and Conservation, State of Montana, I wish to submit the following comments. Because I am in the upper end of the Upper Clark Fork Basin, my comments are directed mainly to the reservation sought by the Montana Department of Fish, Wildlife and Parks.

The DFWP have applied for reservations on both Dempsey Creek and Racetreek Creek. Both of these creeks are heavily appropriated and during the irrigation season all of the water available is taken therefrom. Consequently from the point of diversions above the irrigated lands, both creeks are dry during this period of time. Additionally, there does not appear to be any residual water that arises from the irrigation process and eventually flows into the Clark Fork. It would appear that the only method by which additional water would become available would be to construct dams for water collection during the spring melt. For the benefit obtained, it would appear that the cost would be prohibitive. I believe that in this regard much of the same comments that have been made in regard to the construction of a dam on the northfork of Willow Creek by the Granite County Conservation District, would apply here. The Draft EIS does not appear to be clear as to whether or not the DFWP reservation is for waters above the points of diversion, or for the total length of both creeks.

The DFWP has also applied for a reservation of rights on Warm Springs Creek and subsequently the Clark Fork. The draft EIS does recognize that Warm Springs Creek is also partially dry during irrigation season. However considerable residual water arises prior to Warm Springs Creek entering the Clark Fork.

319. DFWP's requested reservations are to protect instream flows year-round. However, under Montana law, DFWP's requested reservations cannot be granted if the record of the contested case hearing shows that the use of senior water rights would be adversely affected. Existing levels of depletions would still occur. Despite such depletions, DFWP's reservations would still protect flows for dilution and fisheries by giving DFWP legal standing to object to new appropriations that would adversely affect the use of its reservations. See the response to comment 91 and Table 3-2 in Chapter 3 of this final EIS for information on flows in Racetrack and Dempsey creeks.

320. Comment noted. The cost-effectiveness of storage can be accurately determined only on a site-specific basis. DNRC is not aware of any cost-effective storage site proposals in the upper Clark Fork basin. See response to comment 33 for a discussion of storage as it relates to DFWP's requested reservations.

321. DFWP's requested reservation on Dempsey Creek is for one reach of stream extending from Carruthers Lake to the mouth (Sec 29, T7N, R11W to Sec 33, T7N, R9W). DFWP divided Racetrack Creek into two reaches in its application. Reach 1 extends from the confluence of the North Fork of Racetrack Creek to the Deerlodge National Forest boundary (Sec 2, T6N, R12W to Sec 13, T6N, R11W). Racetrack Creek reach 2 extends from the National Forest boundary to the mouth (Sec 13, T6N, R11W to Sec 9, T6N, R9W). See the response to comment 269 for DFWP's explanation of how it might monitor and enforce its reservations.

322. USGS has collected streamflow records since 1983 for Warm Springs Creek at a point approximately 0.9 miles upstream of its mouth. These records indicate that while daily flows are often less than 10 cfs during late summer months and occasionally less than 1 cfs, daily flows have been zero only twice (August 4 and 5, 1988). It is possible that more water enters Warm Springs Creek between the USGS gauging station and its mouth.

These records would generally (though not without exception) seem to support the observation that residual water arises in Warm Springs Creek before its confluence with the Clark Fork. See the response to comment 319.

During the time that the Anaconda Smelter operated, a considerable amount of water entered the Clark Fork after passing through the various settling ponds and water purification devices. This water, of course, enhanced the residual flow from Warm Springs Creek into the Clark Fork.

Due to the closure and demolition of the Anaconda Smelter, this former water is no longer available. Apparently the water is no
323 longer stored in Silver Lake or Georgetown Lake and is allowed to run off during the high water season. It would therefore seem that some arrangement would have to be made to return the smelter water to the Clark Fork in order to give the DFWP reservation any validity. It does not appear from the Draft EIS that much consideration has been given to an attempt by DFWP to work out an arrangement whereby the run-off water could again be stored. Such stored water could possibly result in a more uniform flow being maintained in Warm Springs Creek and ultimately the Clark Fork.

It has been stated, that to produce the Draft EIS, it cost the State of Montana in excess of $200,000.00. This seems to be a considerable amount of money spent, in view of the fact that eventually an EIS will also be produced. I am wondering whether or not there has, or will be, a considerable duplication of efforts. If so, I believe these should be avoided.

324

During the preparation of the Draft EIS, very little or no, public information had been disseminated. It was not until the draft was completed that it became a document of general public knowledge. Perhaps had there been more public knowledge at such time, the cost of preparation could have been reduced and the public kept better informed.

I would appreciate your consideration of my comments. If you wish to discuss them with me personally, I would be happy to meet with you.

Thanking you for your courtesy in the matter, I remain

Very truly yours,

John Vanisko

JV/ts

323. DFWP did not consider the possibility of an arrangement to purchase or lease water rights to Silver Lake or Georgetown Lake water to provide instream flows in Warm Springs Creek or the upper Clark Fork main stem. Subsequent to the filing of DFWP's reservation application, there have been informal discussions between DFWP and representatives of Dennis R. Washington, who acquired senior water rights to Silver Lake and Georgetown Lake when he purchased the Silver Lake Water System from Atlantic Richfield Company. These discussions have been merely exploratory, however. No serious offer has been made by either party to sell, lease, or purchase these water rights (Spence 1990).

Such an arrangement would face a number of serious obstacles, not the least of which may be financial. DFWP also is concerned about the liability for dam safety that they may incur by assuming responsibility for the operation and maintenance of this system (Spence 1990).

324. Your estimate of the cost of producing the draft EIS is in error. DNRC budgeted approximately $80,000 to produce the draft EIS and spent approximately $68,000. The addendum cost approximately $13,400. Comments on the draft EIS and addendum are responded to in the final EIS. Expenditures on the final EIS before publication were about $13,500. Publication and mailing costs are expected to total approximtely $3,500. There should be little duplication of efforts between the two documents. DNRC also wishes to avoid these duplications as they make our job more difficult and unnecessarily costly.

Public scoping meetings were held in April 1987. The purpose of these meetings was to collect public comments before the draft EIS was written. DNRC issued press releases announcing these public meetings and specifically invited those groups who we thought would be submitting applications—the Mile High Conservation District, the Granite Conservation District, and DFWP. Scoping meetings were held in Anaconda, Drummond, and Bonner. Under MEPA, the public also can participate in the EIS process by submitting written scoping comments and by reviewing and commenting on the draft EIS. See also the responses to comments 204, 216, and 240.

Meeting Comments

Comments 325 through 373 are oral comments that were recorded at three public meetings held by DNRC in 1989. The meetings were held in Drummond, Deer Lodge, and Bonner to gather public comments on the draft EIS.

325. In granting a reservation, can the Board modify that request, or is it a yes or no decision?

325. It is not a yes or no decision. The Board may choose to grant a smaller reservation than requested, place conditions on the reservation, subordinate one reservation to another, or deny the request altogether. The Board cannot grant an applicant more water than was requested.

326. Following the Board's decision regarding DFWP's reservation requests, would normal legal avenues for appeal still be open if a person feels that his or her water right is adversely affected?

326. Yes. The Board's decision-making process regarding water reservations is covered by the Administrative Procedure Act (APA). Under the APA, appeal for judicial review by the District Court is provided for any party that fully participates in the contested case hearing (not persons offering public testimony only) and who is aggrieved by the Board's final decision (§ 2-4-704(1), MCA).

However, the District Court is limited in what it can review. The court will only review the record established by the Board and will not consider new evidence or testimony unless the appellant can show good reason why it wasn't presented to the Board. The court cannot substitute its judgment for the Board's, but can only modify or reverse the Board's decision if:

(a) the administrative findings, inferences, conclusions, or decisions are:
  (i) in violation of constitutional or statutory provisions;
  (ii) in excess of the statutory authority of the agency;
  (iii) made upon unlawful procedure;
  (iv) affected by other error of law;
  (v) clearly erroneous in view of the reliable, probative, and substantial evidence on the whole record;
  (vi) arbitrary or capricious or characterized by abuse of discretion or clearly unwarranted exercise of discretion; or
(b) findings of fact upon issues essential to the decision were not made, though they were requested (§ 2-4-704(2)(a,b), MCA).

The District Court's decision can be appealed to the Montana Supreme Court.

327. Where does DNRC or DFWP plan to install measuring devices if DFWP were to get a reservation? I assume they would be at various points down the stream if reservations were granted.

327. At this time there are no plans to install measuring devices. However, the Board may require DFWP to install measuring devices (stream gauges). They might be most useful at the lower end of each stream segment where instream flow reservations are granted. See the response to comment 269 for more detailed information on monitoring plans and costs of monitoring.

328. Why is DFWP asking for a reservation and not obtaining a normal water right (water use permit)?

328. Montana law does not allow the granting of a water use permit for the protection of instream flows. However, state or federal agencies or any political subdivisions of the state such as DFWP are authorized to apply to the Board to reserve flows to maintain a minimum flow, level, or quality of water (§ 85-2-316 MCA).

329. Why couldn't the Flint Creek Water Users' Association apply for a reservation? Why is DFWP applying?

329. The Flint Creek Water Users' Association is not a political subdivision of the state, and is not eligible to apply for a reservation. Conservation districts are political subdivisions and can apply for reservations. DFWP applied because, under Montana law it is the agency responsible for protecting fish and wildlife. In the past, DFWP has objected to new water use permits in the upper Clark Fork basin if such new permits threatened the aquatic habitat. DNRC rejected DFWP's objections because DFWP had no water right that would be adversely affected. By obtaining reservations, DFWP would gain legal standing to object to the issuance of future water use permits where the permits would adversely affect its reservations (DFWP 1986a).

330. If water isn't available to fill an instream flow reservation for 365 days of the year, it would be of limited value to the fish.

330. Fish and other aquatic organisms generally benefit from water flowing in a stream channel. However, stream flows vary during the year and from one year to another. A stream can support a viable fish population even though optimal stream flows do not occur at all times. DFWP data indicate trout numbers in Flint Creek range from 567 to 877 fish per mile in spite of fluctuating water levels (DFWP 1986a).

In addition, if a portion of a stream goes dry during the summer months, but flows are adequate during the spawning and rearing seasons, that reach of stream or the reach above it may still provide important spawning and rearing habitat for part of the year.

331. IF DFWP does not have a record of stream flows on Flint Creek, how does it know what the normal stream flow is?

331. DFWP's flow requests are based on aquatic habitat needs. DFWP's methodology (described in Appendix A of the draft EIS) includes streamflow measurement, but "normal" streamflow is not determined. See Chapter Three for DNRC's estimates of streamflows.

332. Will DFWP's request prevent irrigators in the upper Clark Fork basin from building additional storage projects?

332. Granting DFWP's requested reservations may make new storage development in the upper basin less feasible. The potential for conflict between DFWP's requests and future storage projects would depend on the operating plans for individual storage projects and the amount of instream flow granted by the Board. If future storage projects would store only flows in excess of DFWP's reservations in the spring, there would be no conflict.

Other obstacles to irrigation storage projects may be just as difficult to overcome as potential instream flow reservations. These include difficulty in financing storage projects, satisfying the rights of downstream water users, and complying with existing dam safety and environmental regulations. See also the response to comment 33.

333. Did you take into consideration the effect of 5,000 acre-feet stored in the existing Willow Creek Reservoir on instream flows in the months of June, July, and August in lower Flint Creek?

333. Yes. Figure B-14 and Table B-1 in the draft EIS both take into account the effects of upstream irrigation and storage in Willow Creek Reservoir on the flows of lower Flint Creek.

334. Did you consider the benefits of releasing stored water on Flint Creek as a result of GCD's proposed North Fork of Lower Willow Creek project?

334. The effects of storage releases and return flows from GCD's proposed project are indicated in Table B-3 and discussed in the draft EIS on page 59.

335. If DFWP is granted a reservation, can it get a change in the future and sell that water to somebody else farther downstream?

335. No, DFWP cannot sell or transfer a water reservation right to a private individual or entity downstream. The administrative rules adopted by the Board provide that a reservant may voluntarily transfer a water reservation, but such transfer may only be made to another qualified reservant (state or federal agencies or any political subdivision of the state) and must have Board approval. All Board decisions regarding transfers must reflect a consideration of all criteria used by the Board in issuing water reservations, including whether other water right holders will be adversely affected (ARM 36.16.118).

Instream flow reservations also may be reallocated by the Board. Reallocation is possible if another qualified applicant can show that all or part of the reservation is not required for its purpose, and that the need for reallocation has been shown by the applicant to outweigh the need shown by the original reservant (§ 85-2-316(11), MCA). However, such reallocation cannot adversely affect other water right holders.

336. My wife and I will be affected citizens if there is a break in GCD's proposed dam on the North Fork of Lower Willow Creek. This is an earth-filled dam. Will there be any early warning system in case of a breach and subsequent flood? There needs to be such a system.

336. No flood warning system has been proposed by GCD. The Board may require such a system if the reservation is granted. The North Fork of Lower Willow Creek project would be required to meet the standards specified in the Dam Safety Act (§ 85-15-101 et seq., MCA). See also the response to comment 474.

337. Are you aware of the Flint Creek Water Users' Association water rights that have been filed by DNRC? These rights basically take up all the excess water that's available in Flint Creek at any time during runoff in the spring.

337. DNRC's claimed rights in Allendale Canal total 157 cfs; 75 cfs with a priority date of September 20, 1910, and 82 cfs with a priority date of March 18, 1936. The lower portions of the Flint Creek project rely on natural flows in Flint Creek (including Boulder Creek) to produce enough water to sustain irrigation through the Allendale Canal from May 1 through July. Historically, the Allendale Canal will call for stored water from East Fork Rock Creek Reservoir in late July or early August. If the Boulder Creek project is developed, the impoundment of waters during the early irrigation season could result in earlier demands on the East Fork Rock Creek Reservoir.

338. If DFWP gets this reservation, they would become an additional water user and could object, a situation we don't have today. I think that scares everybody, giving DFWP legal standing to come in and object to something that they don't have a right to do now.

338. Comment noted. As with any other holder of a water right, DFWP would gain legal standing to object to new permits, changes in use or place of use of senior water rights, and to existing rights and claims during the adjudication process.

339. If you own a piece of property that you have a water right on and you sell that property, after DFWP gets its reservation, would the person buying the property have a water right junior to DFWP?

339. No. The person buying the property would retain the original priority date.

340. If I wanted to change the place I use my water after the reservation was granted, would I lose my priority date?

340. No, you would not lose your priority date. However, as with any change, you cannot adversely affect any water users including junior water users by your change. If DFWP or GCD were granted reservations, they could object to such a change.

341. How many water rights have been issued in the upper Clark Fork during the last 5 years?

341. DNRC records show that there are 25 permits for surface water in the upper Clark Fork basin (76G) with a priority date after January 1, 1985 (See Table 4-12). No permits were issued in the Flint Creek basin for surface water in the past five years. See the response to comment 85.

Table 4-12
Permits with priority dates of 1985 to present in the upper Clark Fork basin (76G).

Number of permits	Purpose	Volume (af)
10	Irrigation	1,424.11
10	Domestic	54.3
3	Mining	248.83
2	Fish & Wildlife	1,013.25
25		2,740.49

342. How many changes in water rights have there been in the upper Clark Fork?

342. Since 1973, there have been 35 changes of surface water rights in the upper Clark Fork basin. Four of these occurred in the Flint Creek basin. See the response to comment 85.

343. DFWP has water rights granted by the legislature to instream flow on Rock Creek and the Blackfoot River (Murphy's rights). Has there been any widespread belief or groundswell of opinion that these instream rights are hindering economic development in those areas?

343. These rights were established by the legislature in 1969. Until the summer of 1988, flows were high enough that there was no chance for conflict between DFWP and new water users. During the summer of 1988, notices were mailed to junior water users on the Blackfoot River asking them to turn off their water. DNRC was not aware of any major groundswell of public opinion against the exercise of these instream rights.

344. What makes you think there is water available in Georgetown Lake to use as an alternative to GCD's proposed project?

344. As noted on page 69 of the draft EIS, DNRC examined an alternative which would involve purchasing and changing water rights originally claimed by the Anaconda Mining Company (AMC) in Silver Lake, Storm Lake Creek, and Twin Lakes Creek. These rights have been the subject of some debate concerning their possible sale to the Butte Water Company. Water from these sources was formerly diverted by canal into Georgetown Lake. Possible purchase and use of these rights in Flint Creek was examined, but this alternative did not appear to be economically feasible. While the old AMC water rights are one potential source of water, other water right owners may be willing to sell water to the Lower Willow Creek Water Users' Association. See also the response to comment 323.

345. There are no storage claims that have been filed in Silver Lake.

345. The comment is correct. The claims to Silver Lake water are for industrial water use.

346. How are you going to get the Silver Lake water to the project lands?

346. Water from Storm Lake Creek and Twin Lakes Creek can be diverted into Silver Lake. The upper 10 feet of water in Silver Lake can be diverted through an existing canal into Georgetown Lake and thence into Flint Creek. Once in Flint Creek, water would be diverted by a canal beginning just below Maxville and running approximately 21.6 miles to the point where project canals divert water from Lower Willow Creek just below the existing dam.

347. Would using groundwater help alleviate water shortages such as we experienced last summer? How much does it cost to irrigate with groundwater?

347. In the upper Clark Fork basin, two types of aquifers have been used to supply water for irrigation. Shallow aquifers in the floodplain gravels can yield enough groundwater for irrigation, but such aquifers usually exchange water with the adjacent streams. Pumping water from a floodplain aquifer diverts water that would otherwise enter the stream, in some cases depleting streamflows that senior water rights rely upon.

Aquifers in the older sediments surrounding the shallow aquifers have also been tapped to supply irrigation in the upper basin. A number of high-yield wells in the area exceed 400 feet in depth, and the water may be pumped 150 feet or more to bring it to the surface. Pumping water from these aquifers can indirectly deplete streamflows, and it usually costs substantially more than developing a shallow well or pit. Actual costs would have to be determined on a case-by-case basis.

348. What are the economic benefits of reusing appropriated water two, three, or four times?

348. Return flows from the GCD project on the North Fork of Lower Willow Creek could conceivably be used for additional late season supplemental irrigation. Some of this water could return to the stream in time to be used twice before the end of September. In an average water year, this would increase alfalfa production by 1,400 tons and reduce power production at Montana dams by an additional 244,000 kWh. The value of the alfalfa would depend on the price, but on average would increase net farm income by about $28,000. The cost of lost power production would increase to $6,100. This scenario probably overstates the benefit to agriculture because in an average water year most irrigators will be able to satisfy existing water rights without these return flows. With lower flows that would be exceeded 8 out of 10 years, alfalfa production would increase by 850 tons, and power production would decrease by an additional 62,000 kWh. This would increase net farm income by about $17,000 and increase the value of lost power production to $10,000.

The return flows from the project would be used for additional irrigation only during dry years, but the depletions from the project would reduce hydropower production in all years.

If the return flows were reused for irrigation 2 years out of 10, the average annual benefit from increased downstream irrigation would be about $3,400 and the average annual cost from reduced power production would be about $4,400. If the return flows were reused for irrigation 5 years out of 10, the average annual benefit from increased downstream irrigation would be about $12,000 and the average annual cost from reduced power production would be about $7,000.

349. DNRC has made a mistake in choosing not to make specific recommendations in the EIS. This course of action leaves the participating public unsure of where DNRC stands on the reservation requests. This makes meaningful public participation much more difficult.

350. DNRC should ensure that public meetings on the reservation issue are well controlled so that any individual feels comfortable in speaking his mind. Past meetings (on the State Water Plan) were not well structured. The result was that some members of the public felt intimidated about speaking openly.

351. Some domestic wells in Missoula are drawn down 3 to 5 feet during drought periods. Further depletion of Clark Fork stream flow could result in more severe or frequent drawdowns and substantial costs for well owners.

349. DNRC has not made any recommendations in the final EIS because the record of relevant information is not yet complete. Additional information, in the form of evidence and testimony, will be presented during the contested case hearing, and the Board will review all such evidence when making its decision. At that time, DNRC will act as staff to the Board, and any statement of departmental opinion in this final EIS would be inappropriate.

350. DNRC conducted public meetings on the draft EIS so those who indicated they had a comment were given the opportunity to do so. People who would not or could not speak at a public meeting were encouraged to submit written comments. Based on recent experience with meetings held to discuss the State Water Plan, DNRC has restructured its approach for holding public meetings to ensure that everyone has an opportunity to participate.

351. Comment noted. An excerpt from Woessner (1988a) shows the importance of recharge from the Clark Fork to the Missoula aquifer.

> "The Clark Fork River is a losing stream and seasonally recharges the aquifer over a four to six mile reach. Mass balance calculations show that the river accounts for 90 percent of aquifer recharge. Total aquifer recharge is 15 times greater than withdrawal from Mountain Water Company wells, Clark Fork Water Company wells, and approximately 4,700 individual wells. Based on these data, the apparent valley-wide decline in the water table since 1983 is a result of a reduction in recharge caused principally by lower than normal flow in the Clark Fork River."

However, most aquifer recharge occurs during the spring when flows in the Clark Fork are highest. DFWP has not requested reservations for these high spring flows. Given this fact and the fact there is no legal protection for instream flows below Milltown Dam, the DFWP instream reservations in the upper Clark Fork basin would only provide partial protection to flows that recharge the Missoula aquifer. And even if the 8,362 acres of undeveloped irrigable land in the upper basin were developed, the subsequent depletions would range from 0.4 to 2.9 percent at Missoula. Such slight reductions in flow would have an equally slight effect on aquifer recharge. See also the response to comment 362.

352. Domestic water supply, wastewater discharge dilution, and the river front corridor are important issues to a relatively large urban population in Missoula. This constituency has, however, been fairly quiet on water issues.

352. DNRC notified Missoula and other municipalities in the upper basin of the reservation process before it got underway. Missoula officials expressed interest in protecting streamflows for groundwater recharge, but no municipal applications were received.

353. Downstream hydropower rights provide little protection for instream flows because they haven't been asserted.

353. See the response to comment 274.

354. If downstream hydropower rights are enforced, then DNRC should close the basin.

354. DNRC does not have the legal authority to initiate basin closure. Basin closure can be initiated only by petition of water right holders or by legislative action (see response 208 for an explanation of basin closure procedures).

355. With recreation increasing on the Clark Fork, the river's value as a public resource is also increasing. We need to reserve some of this water to protect the increasing value of the river system.

355. Your recommendation is noted. By its inclusion in this final EIS, your recommendation will be part of the legal record presented to the Board.

356. Does the Board have to consider existing laws pertaining to dam safety and today's standards for spillway design or could the Board assume the dam safety standards will be changed and become less stringent in 10-15 years when GCD proposes to build their dam?

356. The Board has to consider existing laws pertaining to dam safety and standards for design in making findings on public interest. The Board does not have to assume that dam safety standards will change and become more or less stringent in the future.

357. I have trouble believing the proposed dam on the North Fork of Lower Willow Creek will interfere much with beavers. Who wrote this?

357. DNRC staff visited the 0.8 mile-long reservoir site and noted evidence of beaver (dams and gnawed trees). If built, the reservoir would inundate this stretch of existing beaver habitat. Operating the reservoir for irrigation would cause the reservoir volume to fluctuate greatly, reducing its ussefulness as beaver habitat. The dam and reservoir would also hinder the movements of any post-construction beaver population. The size of this population cannot be estimated. The statement to which you refer was written by DNRC staff (please see page 171 of the draft EIS).

358. Regarding the Federal Power Act, do downstream hydropower producers benefit from upstream storage?

358. Such benefits are determined case-by-case. See Chapter Three of this final EIS for the effect of GCD's proposed projects on downstream hydroelectric production. See the responses to comments 35 and 361 for an explanation of payments for benefits due to upstream storage.

359. What are the chances that the legislature will change DFWP's priority date (so DFWP gets more water)?

359. Unlikely. No such legislation has been proposed in past regular sessions of the legislature. Such a change would be contrary to the foundation of Montana water law, the prior appropriation doctrine.

360. Are downstream hydroelectric producers required to pay for benefits from upstream storage projects?

361. Could downstream hydropower producers help pay for upstream storage projects?

362. GCD's proposed storage project on the North Fork of Lower Willow Creek would benefit water quality, would benefit recreation in a small way and would benefit groundwater supplies, especially to Missoula, to some degree. These things ought to be quantified and at least a ballpark figure should be given to the benefits.

360. Only if electricity is produced at an upstream storage facility. See the responses to comments 35 and 361.

361. It is not known if downstream hydropower producers would be inclined to pay for upstream hydropower benefits. It is doubtful that support would be forthcoming if the upstream storage projects would cause more losses than gains for the hydropower producer. See Chapter Three in this final EIS for DNRC's revised estimates of the net effect of GCD's proposed storage project on downstream hydropower production.

362. Groundwater availability between the proposed dam and the irrigated lands may be increased by reservoir operations, but no data exist to quantify this. Only groundwater users who depend on shallow aquifers adjacent to Lower Willow Creek or the North Fork of Lower Willow Creek would benefit. Groundwater recharge is probably already driven by irrigation and is unlikely to change much under supplemental irrigation.

The Missoula Valley aquifer receives a great deal of its recharge from the Clark Fork. GCD's project on the North Fork of Lower Willow Creek would cause slight changes in mean monthly streamflows ranging from an increase of 0.4 percent to a reduction of 0.33 percent at Missoula. This would result in similarly slight changes in recharge to the aquifer. The overall effect would be a net reduction in flows and recharge, which would be negligible.

The project would affect water quality, slightly improving it in some respects and degrading it in others. During project construction, the stream below the dam site would likely suffer an increase in sediment loads. In the long-term, however, the reservoir may trap sediment, reducing loads in the downstream reach. Normal reservoir losses due to evaporation may increase the concentration of nutrients and other pollutants.

(response 362, continued)
When storing, the project would also reduce water available in Lower Willow Creek and Flint Creek for the dilution of trace elements, including arsenic. Return flows may offset this somewhat during late summer and fall, but the increase in flows would be small (see Appendix B in the draft EIS). The quality of groundwater return flows might be lower than the water that was diverted if it carries agricultural chemicals, other pollutants, and low levels of dissolved oxygen. None of these effects can be quantified, given the limited information available. See Chapter Three of this final EIS for more information on water quality and project impacts.

Granting the requested reservation and constructing the planned dam could improve recreation opportunities at the existing Lower Willow Creek reservoir. It is not possible to quantify this benefit, given the limited information available on current and future use at the reservoir. Drawdowns at the proposed reservoir would limit its use for recreation.

363. Have there been any studies to identify storage sites?

363. Yes. The SCS has identified a number of potential storage sites in the upper Clark Fork basin, but their feasibility has not been determined. For the purposes of this EIS, DNRC's analysis of storage was limited to projects proposed to be built within the reasonably foreseeable future.

364. Who should pay for storage?

364. The costs of storage are usually borne by the beneficiaries who participate in proposing and developing projects. In many cases, however, the general taxpayer has also paid a share of the cost.

365. What is the value of the Clark Fork as a fishery and what good is a reservation if the fish are periodically poisoned?

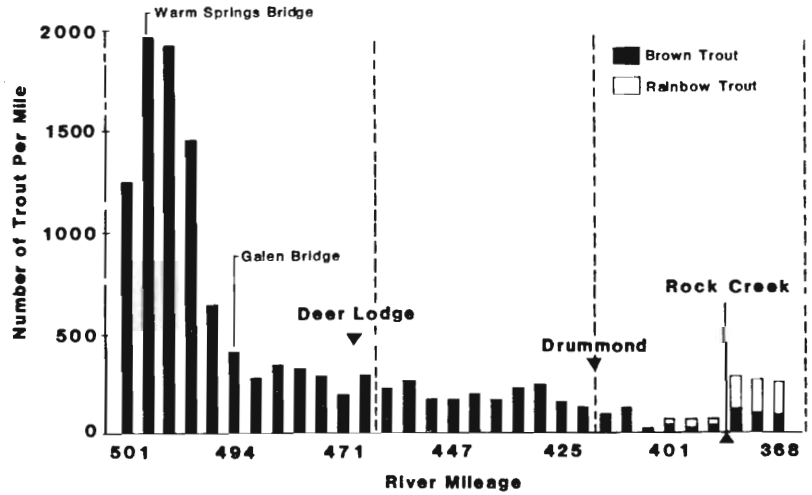
365. The value of the Clark Fork as a fishery depends on several factors including the number of fish in the river, the level of use by anglers, and the economic value of this use.

The economic value of the Clark Fork fishery has been estimated at between $1.5 million and $3.1 million per year (see page 74 of the draft EIS).

Figure 4-8 shows the estimated number of fish per mile at various sites along the upper Clark Fork mainstem. Clearly there are fewer fish in the Clark Fork below Deer Lodge than immediately below the Warm Springs Ponds, where fish populations are fairly high. Fish densities are also substantially lower below Drummond than in other streams in the state. Unless changes in aquatic habitat occur, fish populations in the upper Clark Fork will probably remain the same.

(response 365, continued)

Figure 4-8
Upper Clark Fork River
Total Number of Trout Per Mile in 31 River Segments
(Spring 1987)



Source:Hadley 1989

DFWP has published the results of a study of the value anglers place on fishing (Duffield and Allen 1988). The Clark Fork ranked in the lower third of the 17 rivers studied. The value of a fishing trip on the Clark Fork was rated, on average, at about half the value of fishing trips on the other rivers.

Cleanup efforts are underway along the upper Clark Fork, but it is unknown how clean the river will be or how fish populations will respond to improved water quality. The question of "how clean is clean enough" has not been answered. An update of Superfund activity along the Clark Fork and additional water quality information are presented in Chapter Three of this final EIS. See also the response to comment 290.

Above the confluence of the Little Blackfoot River, the Clark Fork receives a moderate amount of fishing use, with 5,077 angler days recorded in 1985 (DFWP 1989). Lower reaches receive from two to six times as much fishing pressure. How this use is distributed along the river or how it is affected by fluctuations in water quality is unknown.

366. Is it possible to use "icebergs" to store water?

366. A process known as ice mounding has been suggested in some areas as an alternative to conventional water storage projects. GCD has submitted a proposal to test ice mounding in the Flint Creek basin. Ice mounding involves diverting water during cold winter months and spreading or spraying the water over an area and letting it freeze. As the ice mound thaws it is available for downstream use.

367. What is the life of the DFWP reservations?

367. No term has been suggested by DFWP for the protection of year-round flows for aquatic habitat. The reservation of flows from January 1 to April 30 for dilution purposes would remain in effect until clean-up is successful and metals concentration reach acceptable levels. The Board has the authority to determine a time period over which the reservations are valid.

368. There is quite a difference in the Granite Conservation District figures for the cost of building the dam as to what DNRC says it would cost. It seems rather an exorbitant figure that DNRC has come up with. How come? What kind of engineering did GCD use?

368. DNRC based its analysis on the engineering information presented in GCD's application. DNRC's estimates of costs is higher than GCD's because DNRC used higher per unit costs. For example, GCD estimated that fill would cost $2.50 per cubic yard, while DNRC used a figure of $5.25 per cubic yard. A more detailed description of these differences can be found on page 157 of the draft EIS. Also see the responses to comments 36 and 303.

369. What constitutes a high-hazard dam?

369. According to the state's dam safety criteria, if a dam stores more than 50 af of water and there is a possibility of loss of life should the dam fail, the dam is considered a high-hazard dam.

370. DFWP did not have to figure out dam costs and such like the conservation district did. It seems like these groups are operating under two different sets of rules.

370. Two different types of reservations are proposed, one for future consumptive use and one for instream use. Both are considered beneficial uses. DFWP has no dam costs because no means of diversion are proposed. See the response to comment 269 and Chapter Two of this final EIS for cost estimates of administering DFWP's requested reservations.

371. Why is DFWP requesting water for 12 months per year when they only need it for 2-3 months when the river is low?

371. DFWP is requesting instream flows to protect aquatic habitat year-round and to protect water quality (especially in the winter months). Future consumptive uses, such as mining, could divert water during any month of the year. A reservation would give DFWP legal standing to object to such depletions, thus helping to prevent low flows from occurring in other months.

372. How will the DFWP reservations be enforced?

372. See the response to comment 269 for DFWP's monitoring plans and cost estimates. All legal avenues for enforcement would be available to DFWP (see the response to comment 292). See the response to comment 45 for a description of how DFWP has administered its reservations in the Yellowstone River basin.

373. On how many river basins has DFWP requested instream flow reservations?

373. DFWP holds instream flow reservations in the Yellowstone River basin and has requests pending in both the upper Clark Fork basin and the Missouri River basin above Fort Peck.

RESPONSES TO COMMENTS ON THE ADDENDUM

The addendum examined GCD's request for a water reservation, including a proposal to build a dam on Boulder Creek to supply water for irrigation on 4,093 acres southeast of Hall. Comments 374 through 473 include all of the written comments received on the addendum.

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RECEIVED
APR 4 1990
MONT. DEPT. of NATURAL RESOURCES & CONSERVATION

April 3, 1990

John Tubbs
Re: Clark Fork Reservations
Department of Natural Resources and Conservation
Water Resources Division
1520 East Sixth Avenue
Helena, MT 59620-2301

Re: Boulder Creek Dam

Dear Mr. Tubbs:

My family, along with three others, own the old schoolhouse in Maxville. We are very concerned about the Granite County Conservation District's proposed dam on Boulder Creek.

374 A major concern is the fact this would be a high-hazard dam which, if it gave way, could kill a number of people since there wouldn't be enough time to evacuate. Equally important is the impact reduced flows on Boulder Creek would have on the fish population. We are avid fishermen and the destruction of

375 the westslope cutthroat trout and bull trout habitat is disheartening to say the least. No one likes to see a healthy, free-flowing stream dried up!

This project is patently financially irresponsible. The only way it could be feasible is with massive state and federal subsidies. As a taxpayer I find it incredible anyone could be

376 proposing to spend millions of our tax dollars to benefit at most 20 ranch families. Perhaps the better way to help these people is give each family $750,000. It would be cheaper and less destructive to the environment.

Please consider this letter, representing the opinions of 14 part-time residents of Maxville, as the strongest possible objection to the Conservation District's project. Thanks.

Cordially,

Thomas M. Keegan

Thomas M. Keegan, P.C.

TMK rs

374. GCD's proposed dam on Boulder Creek would be classified as high hazard. If it failed, there would be a potential loss of life and property. High-hazard dams are regulated by DNRC's Dam Safety Section, which would require precautions in the design and construction of a dam on Boulder Creek.

DNRC has not determined the precise extent of the hazard area below the dam, but it would extend a considerable distance down the Flint Creek valley. The initial analysis indicates that an unexpected failure of GCD's proposed dam would inundate the drainage with 17 feet of water at the dam site and 15 feet of water at Maxville. A peak flow of 66,000 cfs would reach Maxville in less than 15 minutes. A breach of that magnitude would probably take at least an hour to develop, but because of the short warning time, an evacuation system would be required. This system might include a full-time watchman, automated sensors, radios, sirens, or other precautions.

375. As stated on page 44 of the addendum, the project would have a "substantial detrimental effect on aquatic habitat in Boulder Creek between the dam and the South Fork of Boulder Creek." Such a detrimental effect would likely severely reduce fish populations below the dam, but the data are not available to determine how many fish would be lost. See the response to comment 459.

376. In acting on GCD's application, the Board only has the authority to grant or deny a water reservation. However, the Board will consider the economic feasibility of the project in making its decision.

TROUT UNLIMITED
MONTANA COUNCIL

STAN BRADSHAW
RESOURCE DIRECTOR

P.O. Box 1273
Helena, MT 59624
(406) 443-4171

April 4, 1990

John Tubbs
RE: Clark Fork Reservations
Department of Natural Resources and Conservation
Water Resources Division
1520 East Sixth Ave.
Helena, MT. 59620-2301

Dear Mr. Tubbs:

I am writing to you on behalf of the Montana Council of Trout Unlimited to comment on the Addendum to DEIS on the Upper Clark Fork Basin Water Reservation Applications.

First, I want to commend DNRC on a generally thorough examination of the Boulder Creek dam proposal. In large part, you have given a good discussion of the possible impacts of the project. I do have a few suggestions for improvement, however.

The Montana Council of Trout Unlimited has taken a position not to categorically oppose all dam proposals. If a project can be built without destroying valuable fisheries habitat, provides significant benefits to instream flows, and is economically feasible, Montana Trout Unlimited will ot oppose it. Unfortunately, this project fails on all three of those counts. 377

As to aquatic habitat destruction, the project will severely damage a substantial part of Boulder Creek. The Addendum notes that 1.3 miles of the creek will be inundated by the dam, and suggests that the reservoir will support a limited fishery, at least until it fills with sediment. Even by that conservative assessment, the best one could say is that the reservoir may support a marginal put-and-take fishery. In exchange for that, we sacrifice a wild cutthroat and bull trout fishery. 378

Below the dam, the prognosis is even worse. First, the Addendum indicates at page 44 that the dam will have a substantial detrimental effect on the creek between the dam and the South Fork of Boulder Creek, a distance of about 1.9 miles. The addendum then projects an average monthly reduction in flows of between 25 and 75 percent. While the Addendum says that there is not enough data to develop a quantitive relationship between stream flows and fish population, the available information suggests that the damage to the fishery will be substantial in this stretch also. Having fished in that stretch a number of times myself, I can attest to the fact that it is now a high quality small-stream wild trout fishery. That is not likely to be the case after this porject is built. 379

377. Comment noted. See the responses to comments 33 and 285.

378. Comment noted. See the response to comment 414.

379. Comment noted. DFWP rates Boulder Creek as a Class-3 (substantial) fishery (DFWP 1986). See the response to comment 375.

Thus, on Boulder Creek alone approximately 6.6 miles of stream will be damaged by the project. Nonetheless, there is likely to be additional damage to which the Addendum barely alludes. As the Addendum notes at page 14, Boulder Creek contributes approximately 32 percent of the combined flow of Flint Creek and Boulder Creek. The Addendum, however, does not
380 address what the significance of the reduction of the Boulder Creek flows might be upon the Flint Creek fishery below Maxville. Is there a loss of fisheries habitat caused by the dam, and, if so, what is the character of the loss? Are flows going to be adequate for the passage up the Flint of spawning brown trout? Will there be a reduction of habitat for resident fish in some part of the Flint? These are alll questions that warrant more attention in the final EIS.

380. DNRC developed a computer model to estimate the difference in flows before and after construction of the Boulder Creek dam. Flow estimates in Flint Creek below Boulder Creek, above the Allendale diversion, and above Barnes Creek, before and after construction of the Boulder Creek dam are presented in tables 4-13 and 4-14.

In its application, DFWP estimated that aquatic habitat in Flint Creek could be maintained with flows of about 50 cfs above the confluence of Boulder Creek and with flows of about 45 cfs near the mouth of Flint Creek. Flows of 60 cfs near the mouth of Flint Creek would provide optimal habitat conditions. For the sake of discussion, the effects of the Boulder Creek project on aquatic habitat in Flint Creek can be estimated if the above assumptions are accepted.

Between Boulder Creek and the Allendale Canal, there is enough water in Flint Creek to satisfy aquatic habitat needs in all but the driest years, when flows drop to 55.7 cfs in July and 40.5 cfs in August. After the Boulder Creek project is built, there would still be sufficient water in Flint Creek above the Allendale Canal to meet aquatic habitat needs in all but the lowest flow years (with mean minimum flows of 49.5 cfs in July and 44.7 cfs in August).

In dry years a portion of Flint Creek below Hall experiences very low flows during the irrigation season, principally due to diversions to the Allendale Canal. DNRC has a claimed right to divert 157 cfs for the Allendale Canal (see the response to comment 337). Aquatic habitat suffers in this reach. This situation would be worsened by operation of the Boulder Creek dam.

Above Barnes Creek, flows in Flint Creek currently fall below optimal levels for aquatic habitat during July and August in about 5 years out of 10. GCD's proposed project on Boulder Creek would increase flows in Flint Creek during summers of low flow years, notably during July and August when aquatic habitat is already degraded. The project would reduce flows below 60 cfs during January and February in about 1 year out of 10, but flows would likely remain above 45 cfs.

(response 380, continued)

Table 4-13
Lower Flint and Boulder Creek Basin Model
(without the Boulder Creek dam)[a]

Flows in Flint Creek below Boulder Creek (cfs)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Average	102.6	86.3	73.8	66.1	74.0	85.7	121.1	245.8	384.0	236.0	190.1	128.4
90 %	69.5	60.2	46.0	40.0	44.9	49.5	69.7	132.3	189.0	166.3	160.0	84.6
80 %	81.6	63.2	54.0	45.0	50.9	59.6	81.7	155.5	236.4	187.2	170.6	101.8
60 %	88.1	76.6	61.4	58.1	58.2	71.2	97.0	194.2	315.4	199.1	182.5	120.7
50 %	102.4	83.3	76.3	61.6	65.5	81.7	105.3	212.1	356.6	210.9	190.1	128.9
20 %	125.4	108.5	87.7	82.5	99.9	112.6	144.5	338.2	576.2	276.4	205.5	162.9
Minimum	62.2	52.8	41.5	33.9	35.8	40.6	55.9	115.7	145.6	135.6	108.6	66.7
Maximum	193.8	150.5	159.4	120.4	123.9	135.1	237.8	613.6	665.5	563.1	297.2	175.9

Flows in Flint Creek above Allendale Canal (cfs)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Average	133.0	112.2	93.0	80.9	88.0	99.3	138.4	302.6	434.4	203.1	135.2	136.5
90 %	90.8	80.9	63.5	53.5	59.0	64.1	84.9	178.9	200.7	96.7	93.7	88.9
80 %	103.6	86.4	72.5	60.9	68.4	74.1	98.2	207.3	267.9	115.4	107.8	100.1
60 %	116.6	96.4	82.1	74.4	75.1	79.4	111.4	253.3	354.5	145.8	124.5	120.8
50 %	129.8	110.5	94.6	79.2	81.2	99.5	129.6	280.8	403.2	165.9	132.4	128.8
20 %	164.8	135.1	111.9	100.8	110.7	131.5	165.1	387.1	655.0	272.0	157.8	175.4
Minimum	82.0	74.9	59.7	43.2	44.9	52.0	68.4	163.0	142.7	55.7	40.5	73.1
Maximum	216.5	117.7	173.0	130.6	141.4	148.4	251.8	694.7	763.9	623.5	295.4	218.5

(response 380, continued)

Flows in Flint Creek above Barnes Creek (cfs)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Average	184.2	142.0	109.7	91.4	97.3	108.8	157.3	366.6	387.3	69.2	39.1	151.2
90 %	134.2	107.4	79.6	62.9	67.4	72.4	93.5	204.3	110.5	7.4	8.7	81.6
80 %	143.7	113.2	86.3	70.8	77.0	82.4	109.0	242.7	190.5	9.2	12.3	101.4
60 %	165.3	124.8	99.0	84.4	84.1	88.7	127.8	306.8	282.3	13.2	28.7	135.7
50 %	186.2	140.6	110.9	89.4	90.4	108.4	144.1	342.8	336.7	13.9	29.9	148.7
20 %	220.8	169.7	128.3	111.8	120.3	142.4	193.0	477.2	640.4	115.7	48.3	205.2
Minimum	112.2	97.9	73.8	51.9	52.4	59.8	76.5	162.7	45.8	5.6	5.7	45.1
Maximum	278.9	206.5	201.8	150.7	150.3	165.0	325.6	935.0	882.4	498.5	207.1	261.8

Table 4-14
Lower Flint and Boulder Creek Basin Model
(with the Boulder Creek dam)[a]

Flows in Flint Creek below Boulder Creek (cfs)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Average	103.4	86.7	73.9	66.1	74.0	85.7	121.1	235.4	338.0	155.7	124.7	110.1
90 %	70.4	60.7	46.2	40.0	44.9	49.5	69.7	121.9	143.0	85.8	94.3	69.0
80 %	82.5	63.6	54.1	45.1	50.9	59.6	81.7	145.1	190.4	106.7	105.0	82.4
60 %	89.0	77.0	61.5	58.1	58.2	71.2	97.0	183.8	269.4	118.5	116.8 101.4	120.7
50 %	103.3	83.7	76.4	61.6	65.5	81.7	105.3	201.8	310.6	130.4	124.4	109.6
20 %	126.3	108.9	87.9	82.5	99.9	112.6	144.5	327.8	530.2	195.9	139.9	143.6
Minimum	63.0	53.2	41.6	33.9	35.8	40.6	55.9	105.4	99.6	55.0	43.0	59.8
Maximum	194.7	150.9	159.5	120.4	123.9	135.1	237.8	603.3	619.6	482.6	231.6	156.6

Finally, on the issue of habitat destruction, it is my understanding that additional DNRC inquiry indicates that Flint Creek is a major source of arsenic. If that is true, then the Final EIS should address the impacts of the dam on dilution flows for Flint Creek and the Clark Fork, especially in the winter months. One of the most significant impediments to the recovery of the Clark Fork fishery is the presence of heavy metals in the system. It would be folly to approve a project that is going to exacerbate that problem.

381

(response 380, continued)

Flows in Flint Creek above the Allendale Canal (cfs)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Average	121.7	99.8	82.7	72.7	80.4	91.9	130.3	271.6	390.5	164.2	129.8	127.6
90 %	86.5	71.8	53.8	45.3	50.1	54.9	75.2	144.8	157.6	83.6	97.0	84.5
80 %	98.3	75.5	62.0	51.0	57.3	65.8	88.3	163.1	224.8	107.7	108.9	97.4
60 %	106.7	87.9	69.5	64.6	64.3	77.8	106.4	213.1	310.9	118.9	119.7	116.7
50 %	121.5	97.0	84.5	68.0	71.8	87.9	115.5	237.4	353.3	130.0	129.4	125.9
20 %	149.6	122.8	98.2	90.2	108.0	119.4	156.5	372.0	611.5	209.8	146.2	162.6
Minimum	78.3	64.5	49.3	38.1	39.8	45.1	60.7	131.7	106.2	49.5	44.7	73.2
Maximum	219.4	170.6	173.7	130.9	130.2	143.4	251.7	685.1	718.2	547.9	251.2	181.2

Flows in Flint Creek above Barnes Creek (cfs)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Average	181.1	133.4	100.8	83.4	89.6	101.4	149.2	337.4	352.6	50.6	45.5	159.4
90 %	138.2	101.8	71.4	55.0	58.5	63.3	83.8	155.8	76.7	8.7	11.4	101.4
80 %	147.6	107.7	77.6	61.1	66.3	74.8	99.6	207.7	156.7	10.7	20.3	118.5
60 %	164.4	119.7	87.8	75.1	73.2	87.0	118.8	271.3	248.0	14.5	32.9	144.8
50 %	183.1	132.7	100.9	78.2	80.7	96.8	133.2	293.1	293.7	15.8	36.9	160.1
20 %	211.6	152.3	117.9	101.2	117.4	128.8	192.2	462.9	606.5	71.2	56.3	201.0
Minimum	119.6	92.8	64.8	47.1	47.3	52.9	68.8	134.3	18.5	6.97.5	67.8	66.7
Maximum	289.1	211.3	203.7	151.1	139.2	165.0	325.4	927.3	843.2	422.2	184.5	238.1

a XX percentile flows are flows which, on average, are equalled or exceeded during the indicated month in XX years out of every 100 years.

381. For an update on metals contamination and dilution flows in the upper Clark Fork basin, see Chapter Three in this final EIS. While the state standard for arsenic is 2.2 nanograms per liter based on human health concerns, sensitive aquatic organisms have been damaged at concentrations of 19-48 µg/l (Eisler 1988).

Based on the information in the Addendum, it appears that this project would provide no significant instream benefits. The Addendum suggests some minor increases to the flow at the mouth of Flint Creek and to the Clark Fork in August, September, and October, but shows reductions to those flows in the rest of
382 the year. The addendum notes the the three months of slight increase will have no significant effect on heavy metals concentration. This is a single purpose project for irrigation, and no amount of data massaging will show a net benefit to the maintenance of insteam flows.

Finally, economic feasibility. It appears from the Addendum that even under the optimistic cost estimates provided by Granite Conservation District, this project is a white elephant. Its only beneficiaries might be a few ranches, and then only if everything -- weather, streamflows, cattle prices, etc. line up perfectly. And yet, the Addendum does not address one serious problem that could significantly increase the cost of the project, and if severe enough, make it completely infeasible. That problem is the fault that runs directly beneath the proposed damsite.

383 According to DNRC personnel, this fault has been the source of considerable discussion. Currently, beyond its existence, it appears that there is little specific information it. Nonetheless, it might require significant increases in the cost of the project to adequately anchor the dam footings. At worst, it could be sufficiently bad to render the project infeasible. While it might be too early to tell the extent to which the fault is a problem, the Final EIS should nonetheless discuss its existence and the additional problems that it could pose in the interest of making a full disclosure about the dam's potential costs.

In conclusion, the final EIS should expand its discussion to encompass the impacts described in this letter. Such an expansion will improve the level of disclosure in the document.

Sincerely,

Stan Bradshaw

382. The proposed Boulder Creek project would increase predicted average flows of Flint Creek near its mouth during August (by 21.8 percent), September (by 10 percent), and October (by 0.5 percent). The proposed dam would also increase flows at the mouth of Flint Creek during dry years (80th percentile) and median (50th percentile) years during July, August, September, and October. In fact, the proposed reservoir actually would increase the minimum average monthly flows during dry (80th percentile) years from 34 cfs during July to 36 cfs.

However, the Boulder Creek project would reduce Boulder Creek, Flint Creek, and Clark Fork flows during the remaining months of the year. Of these, Boulder Creek flows would be most sharply reduced.

In its application, GCD does propose to release 5 cfs during the winter months (GCD 1987). Additional releases in average flow years for purposes other than irrigation would decrease the project's reliability.

383. The Boulder Creek project would directly benefit 10 local ranching families if it returns a profit. The economic feasibility of the project would be influenced by several factors, particularly dam design and expenses. The constraints posed by the Philipsburg Overthrust Fault, which crosses the site, have not yet been fully investigated. Before proceeding further with the project, if a reservation is granted, a geologic/geotechnical investigation would have to be conducted. A DNRC surface inspection and the soil bore logs taken by the SCS have not revealed any serious problems (USDA 1978a), but if previous fault activity has created a zone of broken, fragmented rock—or breccia—under the dam site, it could pose a severe constraint to building the dam. Evidence of breccia has been found on the valley flanks above the project site.

The fault appears to have been inactive for some time. Earthquake zones are classified as 0, 1, 2A, 2B, 3, or 4, with 4 being the most severe; the dam site is in a zone 2B. The design earthquake for this site would be on the order of an 8.5 on the Richter Scale at a distance of 60 miles from the site (Oelrich 1990). But dams are not particularly sensitive or vulnerable to earthquakes. No dam designed to meet current standards has ever failed due to an earthquake (Seed et al. 1977). In summary, the fault at the dam site could cause foundation seepage problems, but does not pose a problem because of earthquakes if the dam is built to standards. For further discussion of the site's geological features, see the response to comment 417.

RECEIVED
APR 12 1990
MONT. DEPT. OF NATURAL RESOURCES & CONSV.

10 April 1990

To: John Tubbs
Re Clark Fork Reservations

This letter is to comment upon, and object to, the Reservations of water sought by the Granite Conservation District as it applies to Boulder Creek, (per Addendum for water reservation applications in the Upper Clark Fork Basin)

My wife co-owns property along Boulder Creek and the fact the stream has normally maintained a good steady flow even late into the Summer was her primary reason for purchasing this property. If - the
384 "proposed reservoir" is approved and constructed this will drastically reduce the stream flow and seriously deflate the value of her property. We have spent a generous part of our Summers on the creek in past years and now since we are both retired we plan on spending much more time enjoying the area.

As a catch/release fly-fisherman I have enjoyed fishing Boulder
385 Creek many, many times. The fishing has always been rather good even late into the Summer and Fall however there is little doubt the stream and the fishing will quickly disappear if the reservoir is built. Many times I have seen deer, moose and grouse while wading the creek
386 and these too would probably be gone if the waters and streamside vegetation is depleted.

Aside from the obviously selfish reasons noted above it would appear to be a ridiculous waste of taxpayers money to make an initial investment of over
387 12.5 million dollars and another $76,300 annually for over 50 years to satisfy the demands of a very few farmers to irrigate a relatively small amount of acreage. There is absolutely no way this can be determined to be economically feasible.

Another thought for serious consideration is the potential possibility of
388 Reservoir rupture causing a very serious problem for everyone downstream. Is the state ready to accept any and all liability if this or any other catastrophe occurs? We can only hope the DNRC has weighed all the options and will not support construction of this Reservoir.

Thank you

Jim Rose — Dolores Rose
1429 Badger Dr
Helena, MT 59601

384. For a discussion of the project's effect on property values, see the response to comment 389.

385. See the responses to comments 375 and 379.

386. As stated on page 46 of the addendum, reducing flows in Boulder Creek would eventually decrease the vigor of the riparian vegetation used by deer, moose, and grouse. This decline would reduce, but not eliminate, the use of Boulder Creek habitat by these animals.

387. See the response to comment 465 and pages 60 and 61 in the addendum.

388. For a discussion of dam safety and geological considerations at the site, see the responses to comments 374, 383, 417, and 474. The Board of Natural Resources and Conservation, not the department, will weigh the benefits and costs in making its decision on GCD's request.

RECEIVED
APR 13 90
MONT. DEPT. of NATURAL RESOURCES & CONSERVATION

PHONE 288-5671

FRED L. METCALF, D. V. M.

METCALF VETERINARY HOSPITAL
DRUMMOND, MONTANA

4/11/90

John Tubbs-

Pertaining to the proposed dam on Boulder Creek, I am very much in accord with the majority of people who voiced their disapproval of said dam.

As the owner of a quantity of land in the Magnolia area, the idea of such an event is financially a disaster. I am in the process of selling parcels of land in said vicinity & I am certain no one will wish to build in an area down-stream from a vastly unreliable dam. The selling price of said land varies from $1350.00/100 to $5000.00/100 per acre - some with water rights from Boulder Creek.

389

Ecologically, the plan is a disaster to the flora & fauna & a blot on the serenity & beauty of the area. It will also be very destructive to the aquatic life in the stream.

390

This proposed dam is totally unnecessary - a waste of monies - & maybe lives of the persons living in & near the area. There is an overabundance of dams in this state & many others & one on Boulder Creek is totally unnecessary to the esthetics - livelihood or pleasure of anyone in the area -

391

Sincerely,
M. Metcalf
Box #449
Drummond - Mt - 59832

389. The dam would be rated as high-hazard because of the risk to life and property if it failed. However, the dam would have to be constructed to current safety standards and would therefore be "reliable." For a discussion of dam safety, see the responses to comments 374 and 383.

If the dam is built, the market value of residential property immediately downstream could be reduced because of the aesthetic and safety concerns of potential buyers (see comment 397). Other land surrounding the proposed reservoir could become more valuable for residential or recreational use, but in some places steep slopes might preclude development. Also, the potential for extensive mudflats and poor reservoir fishing during low flow years could limit the recreational value of land around the reservoir (see the response to comment 463).

390. The ecological effects of the project are analyzed on pages 43-49 of the addendum. For a discussion of the scenic and aesthetic values affected by the project, see the response to comment 403.

391. The Boulder Creek project would directly benefit 10 local ranching families if it could be operated profitably. The Board will weigh these benefits against the costs borne by other people, including residents of the Boulder Creek and Flint Creek valleys.

RECEIVED
APR 13 1990
MONT. DEPT. of NATURAL
RESOURCES & CONSERVATION

April 9, 19-90.

Dear Sir's

In regards to the proposal of a dam being built on Boulder creek.

My self my family also all the people who live here and are also property owners are strickly against such a project

392 The danger that could occur up here from such a project is immence we don't want such to happen for a person can't live in fear so all we can do is all out for a great loss if any one else would want to live below a dam not me or my family for sure.

393 Others who live here fear the same. another thing we all have drilled wells they would go dry. Property Value go down Taxes

394 go up it just isn't fair

Every one I have spoken too are fully against the dam.

392. For a discussion of how local property values would be affected if the dam were built, see the response to comment 389. See the responses to comments 374 and 383 for an analysis of dam safety at GCD's proposed project on Boulder Creek.

393. Most of the wells serving homes between Maxville and GCD's proposed dam site are relatively shallow, often less than 40 feet deep, and were drilled in the unconsolidated sediments deposited or reworked by Boulder Creek. This aquifer is shallow, narrow, and probably highly permeable. Aquifers with these characteristics are typically very sensitive to streamflows in adjacent streams. Groundwater availability from this aquifer may be noticeably reduced if streamflows are diminished. Some wells might need to be drilled deeper into bedrock aquifers, and well yields and water quality might be lower.

394. DNRC's analysis of the Boulder Creek project's effect on Granite County tax revenue is found on page 54 of the addendum. For a discussion of the effect on local property values, see the response to comment 389.

If it does come to pass what is to happen to our homes I have been here for 50 year and have seen many changes
395 This will be the most disastrus one of all.
I pray it never happens. for I Wanted like to live out the remainder of my life here in peace.
Thank you.
Mrs. Grace Lundgren
244 Maxville Rd
P. Burg Mt. 59858

Phillipsburg

P.S. Shortly after Friday last week was in the Burg at the Groc store the topic was about the dam
396 One young woman said cant happen for every week-end we grab up the kids and potato salad head for Boulder creek.

395-396. By their inclusion in this EIS, your comments will become part of the legal record presented to the Board before it acts on these reservation applications.

April 12, 1990

John E. Lubbs
Water Management Bureau
Water Resources Division

RECEIVED
APR 13 1990
DEPT. OF NATURAL
RESOURCES & CONSERVATION

Dear Ms. Lubbs:

After having attended the meeting you conducted on April 4, 1990 at Drummond, Mt., I wish to let you know that my husband & I are very much opposed to the reservation site being proposed for Boulder Creek. I agree with all the opposition which was voiced at the meeting.

We certainly would not have purchased our property on Boulder Creek had we known that there were any thought 397 of a reservation being constructed above us. We purchased the land with the thought of building a cabin in the future, also as a place to relax & get away from everyday pressures.

Since the meeting we have discussed selling our property, but who would buy it now or give us what we have already invested in it.

If the reservation should go through, what assurance 398 would we have that it would hold. If it should break will we be compensated in anyway & by whom?

As you know there are much better sites elsewhere. 399 Why have you spent all this money researching a site which you know is not feasible.

At the meeting I gave my Maxville address, yet my mail comes to Drummond.

Sincerely,
R. Earleen Adler
Box 413
Drummond, Mont. 59832

397. For a discussion of the effect that GCD's project on Boulder Creek would have on local property values, see the response to comment 389.

398. DNRC analyzed the dam safety aspects of GCD's project in response to comments 374 and 383. Liability for the project is discussed in response to comment 474.

399. GCD, and not DNRC, selected the storage sites proposed in the application. DNRC notified GCD that the Boulder Creek project was infeasible based on an initial engineering analysis, and GCD chose to proceed with the application. Under Montana law, DNRC was required to process the application and to assess the potential impacts in an EIS. DNRC also analyzed alternatives, as described on pages 55 through 58 of the addendum.

April 12, 1990
Milltown, Mont. 59851

John E. Tubbs
Water Management Bureau
Water Resources Division

We are writing this letter in opposition to the building of a dam or any other further development on Boulder Creek in Granite County! This area is one of the few remaining places that the water can be used for drinking or any other recreational purposes. This stream is also the home of native Cutthroat trout, Bull trout, Rainbow trout, and also Whitefish. Many species of wildlife use this stream and surrounding areas for food and water.

Further development beyond what has already been established would further degrade what is a beautiful and pristine valley. The B.P.A. power line is an example that detracts from its beauty. And also you already know that many earthquake faults crisscross this area.

As indicated on the map the dam would be placed right over our retirement home, which has taken me and my family years of hard work to complete. We build this home here for the peace and tranquility, plus the beauty of the area. We believe that the recreational values and many homes established in this area far outweighs that 20 or so ranchers might benefit.

Let us not destroy anymore of our land and streams! We hope that you will give this careful consideration in your finale decesion.

Sincerely
The Lundgren Family
Harold D. Lundgren
Alberta Lundgren
Randy D Lundgren
Richard D Lundgren

400. Many streams in Montana, like Boulder Creek, are classified by BHES as being suitable for drinking after conventional treatment and for recreation (B-1 classification).

401. Comment noted. Information available to DNRC indicated that brown, bull, and cutthroat trout are found in Boulder Creek (DFWP 1986, MNRIS 1987, Thomas and Workman 1986) Your observations of rainbow trout and mountain whitefish are noteworthy.

402. The local wildlife is described on page 26 of the addendum.

403. The proposed dam with its 145-foot high embankment and 1.3-mile long reservoir would dramatically change the existing setting in the Boulder Creek valley. Final design and operating plans for the project, which have not yet been prepared, would help in evaluating project appearance.

404. The local faults are discussed in the responses to comments 383 and 417.

405. On page 46 of the addendum, DNRC mentioned that one house just above the dam site would be inundated if the Boulder Creek project is built. This house is owned by Harold and Richard Lundgren (Lundgren 1990). Other residents would experience less severe impacts, from increased noise, dust, and traffic during construction to permanent changes in the valley's scenery (see the response to comment 403). GCD's proposed project on Boulder Creek would directly benefit 10 local ranching families if it could be operated profitably.

RECEIVED

APR 16 1990

MONT. DEPT. of NATUR
RESOURCES & CONSER

4/13/90

Dear Mr. Tubbs,

After reviewing the draft environmental Impact Statement for water reservation applications in the upper Clark Fork basin, I feel that GCD's proposal is a bad one, at best. It is economically unsound and State & federal revenue would need to be used. I feel this revenue money would be better spent on improving & / or reasonably existing natural resources. To benefit a few ranchers would mean a great expense to the taxpayers, and essentially destroy Boulder Creek & Flint Creek as prime Fish habitat areas. I strongly oppose GCD's reservoir/canal proposal!!

406

407

Thank-you for your time,

Cathy Romeo

Cathy Romeo
1801 Arthur
Missoula, MT 59801

Registered Nurse &
concerned citizen.

406. If GCD requests federal or state subsidies, the agency involved would weigh the benefits and costs of the proposed Boulder Creek project against the benefits and costs of other proposals or opportunities. See also the response to comment 451 and 465.

407. GCD's project would have a substantial detrimental effect on aquatic habitat in Boulder Creek between the dam and the South Fork of Boulder Creek. The impacts to aquatic habitat in Flint Creek are examined in response to comment 380.

Ron Pierce
103 Stewart St.
Opportunity, MT 59711

John Tubbs
RE: Clark Fork Res.
DNRC, Helena.

Dear Mr. Tubbs;

About the water Reservation on Boulder Creek:
This water request is so ridiculous that I can't bring, lower myself, to debate the
408 issue! Whoever is responsible for this should be horse whipped and run out of town.

Sincerely,
Ron Pierce

408. Comment noted.

Washington Water Power

Bob D. Anderson
Manager
Licensing & Environmental Affairs

April 13, 1990

Mr. John Tubbs
Department of Natural Resources and Conservation
Water Resources Division
1520 East Sixth Avenue
Helena, Montana 59620

Dear Mr. Tubbs:

RE: Clark Fork Reservations

The Washington Water Power Company (WWP) appreciates the opportunity to comment on the "Upper Clark Fork Basin Water Reservation Applications Addendum Draft Environmental Impact Statement". We have previously commented on the Draft E. I. S. in early 1989. These supplemental comments focus only upon the Granite Conservation District's (G.C.D.) Boulder Creek reservation request which concerns possible additional consumptive use of water in the basin.

409 1) The Draft E.I.S. and the Addendum confirm that reservations for consumptive water uses in the Clark Fork are limited to times of the year when unappropriated waters are available. The Draft E.I.S. at page 18 documents that the maximum period of time water may be available for appropriation is approximately 22 days per year (when there is water in excess of WWP's water rights at the Noxon Rapids Project). There may actually be no excess water available when one considers all of the senior water right holders in the basin.

Of course reservation requests must also meet other tests including applicant qualifications, need, economic viability, and public interest, as required by Montana law and regulations.

The Washington Water Power Company P.O. Box 3727 Spokane, Washington 99220 (509) 489-0500 / 1-800-727-9170
SERVING EASTERN WASHINGTON AND NORTHERN IDAHO WITH ELECTRICITY AND NATURAL GAS

409. The availability of water remains uncertain in the Clark Fork basin, particularly in light of the large water right claims for hydropower production held by WWP and MPC. But neither of these water right holders has yet formally objected to the issuance of provisional water use permits in the Clark Fork basin. The Board may address the water availibility issue when it acts on the pending reservation applications.

2) All senior water right holders along the mainstem of the Clark Fork River are entitled to fully exercise their rights. Every increment of new consumptive water use which depletes flow in the river adversely affects such senior rights by either; a) depriving them the full use of their property without just compensation; or b) needlessly complicating the enjoyment of such rights by forcing action against junior rights holders.

410

3) Contrary to the assumptions made on return flows presented in the Addendum on pages 43-45, D.N.R.C.'s November 1988 study "Effects of Future Irrigation Development on Hydroelectric Generation in the Clark Fork River Basin", prepared by A.B. Cunningham et. al. , confirms that new irrigation directly impacts the amount of water available for hydroelectric generation. Therefore, timing and rates of return flows are not a relevant consideration because it appears that all or nearly all of the water in the basin is already legally appropriated.

411

4) The possibility of G.C.D. overcoming the constraints, imposed by senior hydropower water rights or other senior rights, is discussed in the Addendum. There are many other "what if " possibilities not discussed which could also weigh in the final disposition of this reservation request. However, future possibilities are not relevant to the facts of record on which decisions must be based.

412

Sincerely,

Bob D. Anderson

Bob D. Anderson
Manager, Licensing and Environmental Affairs

RL:pl

cc: R. Blair Strong (Paine, Hamblen, et. al.)
Mike Zimmerman, Montana Power Company

410. New consumptive water uses in the upper Clark Fork basin could conceivably affect the claimed water rights of WWP. However, as noted in response to comment 409, WWP has not yet objected to the issuance of provisional water use permits and has not presented evidence in the proper forum to demonstrate that its claimed water rights have been adversely affected.

411. Pages 43-45 in the addendum refer to the effects of GCD's Boulder Creek project, including estimated return flows, on fisheries and recreation, not downstream hydropower. The net depletions in flow that would occur at Noxon Rapids due to GCD's project on Boulder Creek would have a negligible effect on fish or recreation at that point on the river. But the same net depletions do reduce hydropower production and income, based on estimates prepared by DNRC, which are described on pages 51-53 of the addendum. DNRC has since revised its estimates of the effects to hydropower production; see Chapter Three of this final EIS.

412. In its application, GCD proposed four strategies to overcome possible constraints posed by claimed hydropower water rights. DNRC included an analysis of these strategies for the Board's information.

FIVE VALLEYS AUDUBON SOCIETY

P.O. BOX 8425, MISSOULA, MT 59807

April 12,

John Tubbs
DNRC
1520 East Sixth Avenue
Helena, MT 59620-2301

RE: Clark Fork Reservations

Dear Mr. Tubbs:

Five-Valleys Audubon would like to thank you for another opportunity to comment on water reservations for The Clark Fork. My initial response reading the addendum to construction of another reservoir is benign considering the drought cycle we live with and the necessity to reserve water. On further scrutiny of the draft EIS I have a few comments about riparian habitat to make.

First the project is admittedly underfunded at this time and water in The Clark Fork is already over appropriated (p. 7). From a business viewpoint this project is already unfeasible for two very important reasons. But the riparian habitat that exists along The Boulder Creek area that would be inundated by a reservoir is further cause for concern.

413 I am not reassured by the comments on p. 46 that eliminate habitat over 145 acres used by mule deer, moose, mountain grouse, beaver and songbirds and replace this space with water good for a hopeful population of waterfowl ard muskrats. Waterfowl and muskrats are wonderful creatures but in an area that already supports such hard-to-find species such as mule deer, grouse, and moose (and some would say even songbirds although the species are not mentioned) I do not gladly trade habitats. Diversity of species is always preferable to a healthy environment, one that can survive man's developing instincts and natural disaster.

414 The water level fluctuations mentioned seem to be very large and I question the ability of even minimal species to want to live in such a changing environment. We remember the destruction of fisheries in reservoirs where large fluctuations occur, such as the Libby Dam. Also the water flow directly below the dam will supposedly be reduced by 90% and toward
415 Maxville by 75%. This is a large reduction of water to that existing riparian habitat.

I encourage you to reconsider permission to build this reservoir and again thank you for this opportunity to comment. Five-Valleys Audubon wishes to remain apprised of further developments.

Sincerely,

Linda Helding

Linda Helding

Chapter of the NATIONAL AUDUBON SOCIETY

413. Replacing about 145 acres of existing wildlife habitats, some of them riparian, with a reservoir could decrease the local diversity of terrestrial plants and animals.

414. The estimated fluctuations in reservoir volume would be large—dropping over 6,200 af (or 73 percent of reservoir volume) from July through October in a mean flow year. But GCD's proposal includes maintaining a conservation pool of 170 af, which would provide limited habitat for trout until it fills with sediment. After the pool fills with sediment, the reservoir is expected to be drained to 10 to 20 feet deep during October in roughly 2 years out of 10. Occasionally it would be completely drained, and any fishery in the reservoir would be destroyed by these complete drawdowns. Other species might also be affected by such habitat fluctuation. See pages 43-44 and the table showing estimated reservoir volume on page 77 in the addendum.

415. On average, annual Boulder Creek flows would be reduced approximately 47 percent downstream from the dam and 38 percent near Maxville. Mean September flows below the dam would be reduced by up to 94 percent. See pages 66-67 in Appendix A of the addendum.

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
BUTTE DISTRICT OFFICE
P.O. BOX 3388
BUTTE, MONTANA 59702-3388

RECEIVED
APR 20 1990
DNT. DEPT. of NATURAL
RCES & CONSERV.

IN REPLY REFER TO:
1793

APR 19 1990

John Tubbs
Re: Clark Fork Reservations
Department of Natural Resources and Conservation
1520 East Sixth Avenue
Helena, Montana 59620-2301

Dear Mr. Tubbs:

We have reviewed the draft Environmental Impact Statement for water reservations on the Upper Clark Fork Basin. We find nothing that would adversely affect BLM programs or planning. We appreciate the opportunity to review and comment on your proposal.

416

Sincerely yours,

James R. Owings
District Manager

416. Comment noted.

RECEIVED
APR 27 1990
MONT. DEPT. of NATURAL RESOURCES & CONSERVATIO

Leonard J. Connors
P. O. Box 304
Philipsburg, Mt. 59858

April 26, 1990

John Tubbs
Re: Clark Fork Reservations
D. N. R. C.
1520 East Sixth Avenue
Helena, Mt. 59620-2301

Dear Mr. Tubbs
I am writing you in oposition of the proposed water reservation and dam on Boulder Creek in Granite County. Although I realize the importance of reserving the water for future use I feel that any dam built on Boulder Creek would be to high of a risk. The area is full of underground caverns and faults. This fact in itself makes this project a very dangerous thing to undertake. Its danger to human life is extensive and not acceptable.

417

417. Dam safety is discussed in response to comment 374. Faults and cavernous limestone are found near GCD's proposed dam and reservoir site. The Philipsburg Thrust fault underlying the dam site is evidence of past compressional stresses that pushed older rocks on top of younger formations. Such overthrust forces are no longer characteristic of the Flint Creek Range, and the Philipsburg Fault is not likely to shift or move. The occasional, minor earthquakes felt by area residents are probably caused by movements along other, so-called normal faults. A number of normal faults have been mapped in the Boulder Creek area, though none are shown within the proposed dam site itself (McGill 1965). See also the response to comment 383.

A DNRC geohydrologist briefly examined rock outcrops several hundred feet above the reservoir site on the northeast flank of Boulder Creek. Several zones of broken, fragmented rock—or breccia—were found, reflecting the faulting in the area. One outcrop consists of a dense, compact breccia with abundant fine gouge or secondary calcite cementation and would not offer a likely path for groundwater flow. But another outcrop includes breccia with comparatively little matrix material between coarse breccia pieces. This structure could provide a flow path for groundwater and reservoir leakage if it passes beneath the site. Neither of these brecciated zones matches the mapped features of McGill. Minor faulting and associated breccia may be found elsewhere near the proposed reservoir. A more detailed study would be required to determine whether these types of zones would significantly affect the design, construction, or operation of the reservoir.

Most of the reservoir site is underlain by limestone of either the Devonian-aged Jefferson Formation or by the Mississippian Madison Group. Caverns can be seen in outcrops of both types near the reservoir site. In western Montana, the Madison group is typically cavernous, more so than the Jefferson Formation, though substantial caves are found in the latter also (Campbell 1978). On at least one recent occasion, water-well drillers apparently encountered a large underground hole near the proposed site (Armstrong 1990), probably in Madison Group rocks. There are no known sinkholes or major bedrock springs in the area that would indicate that groundwater flows are controlled by underground caverns. But solution cavities may exist, even below the reservoir site. More detailed site investigation would be needed before the dam could be built.

I also have read the Draft Enviromental Impact Statement and find the project would not be economicily feasable and would
418 create more problems then it would solve. The benefit received would not out weigh the risk and damage to the land that would be destroyed by the project.

Boulder Creek is also one of the last four remaining spawning
419 beds for bull trout and one of the last beautiful free clear flowing streams. This should be preserved.

I thank the D. N. R. C. for any consideration given to this letter.

Cordially,

Leonard J. Connors

418. The Board will weigh the benefits and costs (including environmental impacts) when acting on the proposed reservation.

419. Bull trout are rated as a species of special concern (native species with a restricted range and, in most cases, found in limited numbers in Montana) in Montana (MNHP 1989). Bull trout are reported to spawn in Boulder Creek, but this has not been confirmed (DFWP 1986a). In the upper Clark Fork basin including Rock Creek, bull trout have been found in 27 streams. Statewide, there are 318 streams with bull trout (NRIS 1990a). It is not known how many streams provide spawning habitat. The aesthetic values that would be affected by GCD's proposed project are discussed in response to comment 403.

Montana Department of Fish, Wildlife & Parks

1420 East Sixth Avenue
Helena, MT 59620
April 30, 1990

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APR 30 1990
MONT. DEPT. of NATURAL RESOURCES & CONSERVATIO

Mr. John Tubbs
Department of Natural Resources and Conservation
Water Resources Division
1520 East Sixth Avenue
Helena, MT 59620-2301

RE: Clark Fork Reservations

Dear John:

We have reviewed the draft addendum to the upper Clark Fork Basin water reservation application's EIS and have the following comments:

420 Page 1, Column 2, next to the last line - Should the year 1989 really be 1988?

421 Page 7, Column 2, Number 2 - This GCD strategy to overcome water availability problems would only be practical for water uses below the Flathead River. The water exchange with Hungry Horse Reservoir could still allow the dewatering of the upper Clark Fork Basin by new irrigation water uses.

422 Page 8, Column 2, Paragraph 2 and Page 9, Column 1, Paragraph 1 - Apparently in the GCD reservation application, unquantified benefits and costs of the project are listed and GCD estimates that the indirect benefits would be greater than the indirect costs. Since both the costs and benefits were unquantified, no proof exists for this conclusion.

423 Page 12 - The map should have an X at the junction of Silver Bow Creek and Warm Springs Creek to show the upper limits of reach 1 of the Clark Fork River.

424 Page 12 - The Reach 2 designation for the Little Blackfoot River is somewhat misleading where it is located. The reach extends from Dog Creek to the mouth of the Little Blackfoot River.

425 Page 32, Column 1, Third paragraph - The reference to existing downstream water rights is unclear as to whether these water rights are the MPC and WWP water rights only or whether other existing water rights are also being addressed.

420. The meetings were held in March and April of 1987.

421. DNRC's analysis of strategy 2 appears on page 33 of the addendum and states, "This exchange water would make up for reduced flows at the Thompson Falls and Noxon Rapids power plants, but would not mitigate the depletions above Milltown Dam."

422. In its application (page 32), GCD asserted that the unquantified indirect benefits would exceed the costs (GCD 1987). Chapter One of the addendum summarizes GCD's proposal by restating the district's findings without evaluating them. DNRC's analysis of the proposal is presented in Chapter Three of the addendum.

423. The upper limit of reach 1 of the Clark Fork main stem is defined on the map by the confluence with Warm Springs Creek and the broken line representing Silver Bow Creek. The map legend shows a broken line as designating "stream reservations not requested." An "X" would help define the reach, but would conceal the location of the Warm Springs Ponds.

424. Comment noted.

425. The paragraph in question refers to all senior water rights downstream from the proposed project. Because of their size and priority dates, MPC's and WWP's hydropower water rights could pose the largest individual constraints on consumptive use development in the upper basin if they object to new appropriations and the objections are upheld. To date, neither WWP nor MPC has submitted formal objections. But other water right holders can and do object to new uses and may also constrain development. See the responses to comments 409-411.

Page 33, Column 1, First paragraph - It is unclear if Case 2 refers only to hydropower rights. If Case 2, in fact, does refer only to hydropower rights, then the last sentence in the first paragraph on page 33 is correct. However, if existing water rights other than hydropower rights are also involved in Case 2, then the sentence is not correct (see preceding comment). 426

Page 33, Column 2, Third full paragraph - It cannot be overemphasized that although water releases from Hungry Horse would make up for reduced flows at the Thompson Falls and Noxon Rapids power plants, such exchange would not prevent the continual depletion of water in the upper Clark Fork Basin. 427

Page 43 and 44 - Discussion in the Fisheries section indicates significant impacts of the Boulder Creek Reservoir on fisheries. It is evident that existing stream fisheries within the reservoir pool area will be destroyed, a new reservoir will not be capable of providing consistent habitat to produce fish, and streamflows in Boulder Creek below the dam will be significantly reduced. On Page 44, the second column, paragraph 2, the statement is made that reduced downstream flows could be mitigated by releasing additional water from the reservoir. The additional water would not mitigate for any cutthroat or bull trout migrations which would be blocked by the dam. It can only be concluded from this discussion that the Boulder Creek project would have significant fisheries costs and few fisheries benefits. The same can be concluded for the Recreation section on Page 45. The Boulder Creek project will not have very many benefits to recreation. 428

Sincerely,

Liter

Liter Spence
Water Resources Supervisor
Fisheries Division

dr

426. See the response to comment 425. GCD's four strategies are aimed at overcoming the possible constraints posed by the large hydropower water right claims held by WWP and MPC in particular. If one of GCD's strategies is successful, other senior water right holders could still object and possibly stop the project if the objections are upheld. But Case 1 also encompasses the possibility that objections raised by the hydropower companies would not be upheld and that other right holders would not object. In this instance, GCD could build the project and impacts would occur as described under Case 2.

427. Comment noted. This strategy is intended to satisfy hydropower generation demands at Thompson Falls and Noxon Rapids. See the responses to comments 412 and 421.

428. The Board must weigh such costs and benefits when acting upon GCD's reservation application.

Clark Fork Coalition

P.O. Box 7593 • Missoula MT 59807 • (406) 542-0539
P.O. Box 1096 • Sandpoint ID 83864 • (208) 263-0347

27 April 1990

John Tubbs
Department of Natural Resources and Conservation
Water Resources Division
1520 East Sixth Avenue
Helena, MT 59620

Dear John:

The Clark Fork Coalition has reviewed the addendum for the upper Clark Fork Basin water reservation applications and we suggest that the final EIS recommend that the Board of Natural Resources and Conservation deny the application of the Granite Conservation District for the Boulder Creek Project. 429

The reservation request for the Boulder Creek project does not meet criteria in the Montana Water Use Act establishing the need for the reservation or that it is in the public interest. Moreover, the economic and environmental costs of the project for which the reservations are requested will preclude the reservoir and delivery system ever being built. The Coalition finds it unfortunate that the Granite County Conservation District did not make this reservation request in a more concrete fashion before its letter to DNRC on July 27, 1989 -- which was almost seven months after the agency released its draft EIS on DFWP's reservation request and the conservation district's proposed project on the North Fork of Lower Willow Creek. A more timely request and analysis would likely have helped speed up what has already been a laborious and time consuming study. 430

The request does not demonstrate need because the Boulder Creek project will service only 10 family-owned ranches (p.49) in a county where only 19 percent of the residents have been classified by the U.S. Census as "rural-farm" residents. In addition, according to the U.S. Dept. of Commerce, agriculture produces only about 9 percent of the total income in the county and only about 2 percent in the upper Clark Fork basin. Therefore, the irrigation produced by the project would not add much to the local or regional economy (as stated on p. 50). 431

The project also will not:
- produce additional long-term employment to the area (p. 31).
- produce much additional taxes for Granite County (0.6 percent increase to Granite County's total taxable value, p. 54). 432
- add any economic stability if it produces additional financial burden to the ranches it services, as would be the case if the project is not 100 percent subsidized, cattle prices are low and low-precipitation years force the reservants to have to release reservoir water to satisfy senior water-right holders.

429. A determination of whether GCD's project is needed and in the public interest will be made by the Board after the contested case hearing. Based on DNRC's analysis, the costs associated with the proposed project would appear to be prohibitive, but the dam and canal could be built if GCD obtains subsidies. See the response to comment 451.

430. The Boulder Creek proposal was included in GCD's original application, which DNRC received in 1987. An initial engineering analysis showed the project to be infeasible, and DNRC met with GCD during the spring of 1988 to discuss withdrawing its reservation application for the Boulder Creek project. Based on comments made by GCD at this meeting, DNRC did not examine the Boulder Creek request in the draft EIS. In May 1988, GCD sent a letter to DNRC stating its intention to pursue the project, thus necessitating publication of the addendum.

431. Need for the reservation is not based on the size or range of the benefits produced. According to the Administrative Rules of Montana, a reservation is needed if "there is a reasonable likelihood that future instate or out-of-state competing water uses would consume, degrade, or otherwise affect the water available for the purpose of the reservation" (ARM 36.16.107B(2)(a)). The Board will base its decision in part on whether GCD's project meets this criterion.

432. Comment noted. DNRC's analysis of the project's economic effects is found on pages 49-55 of the addendum.

The reservation is not in the public interest because it depends on public subsidies and:
- the project doesn't come close to having a positive benefit/cost ratio.
- public money spent on the project would be better spent on water conservation projects, repairing existing storage facilities and purchasing or leasing water for in-stream flows.
- the reservations conflict with a reservation request by DFWP, which can demonstrate a greater public need for its proposal.
- reduce revenue at downstream hydroelectric plants by $226,000 annually.

433

It also is not in the public interest because the project would cause unacceptable environmental damage by reducing the annual flow in Boulder Creek by 47 percent and diminishing stream discharge below the dam in September from 16 C.F.S. to 1 C.F.S. That will drastically change stream morphology, diminish fish habitat and food, and reduce flows needed for pollution dilution in the Boulder and Flint Creeks. The project will also destroy 1.3 miles of stream and inundate a wetland, causing irreparable damage to a cutthroat and bull trout fishery, the latter which is a species of special concern in Montana.

434

The recreation benefits of the reservoir claimed by GCD are low because small reservoirs of this type are generally not used much, especially when in remote areas. In addition, drawdowns on such a small facility will hamper the fishery and recreational appeal. Moreover, there are a number of other reservoirs and lakes in the area offering a better recreation experience, enough such that supply probably outstrips demand.

435

We have identified several areas in the addendum that need correction or further analysis. They include:

436 - p. 9 -- FERC issued an order 2/28/90 extending Montana Power's Milltown license until Dec. 31, 1999.

437 - p. 8 -- Annual cost of the project is determined assuming a 5 percent discount rate. That is probably extremely conservative if not overly optimistic given an estimated 50-year project life.

438 - p. 40 -- a probability analysis and cost effectiveness estimate of how often the project would have to satisfy senior diversions between Boulder and Douglas Creeks by releasing water from the reservoir at the amount of inflow would probably add to the already dismal economics of this proposal.

433. A summary of the facts on GCD's Boulder Creek project relevant to the Board's public interest criterion can be found on pages 60-62 of the addendum.

434. DNRC's analysis of these impacts is found in Chapter Three of the addendum. The Board will weigh whether GCD's project is in the public interest, as described on pages 60-62 of the addendum, when it acts on the district's application after the contested case hearing.

435. The fisheries and recreation impacts of GCD's proposal are described on pages 43-45 of the addendum. See also the estimates of angling pressure in Chapter Two of this final EIS.

436. Comment noted.

437. There is no connection between project life and the discount rate appropriate for analyzing a project. See the response to comment 440.

438. If senior water right holders successfully assert their rights, GCD's proposed project on Boulder Creek would not be able to store water when downstream rights experience shortages. This would reduce the amount of water available for storage and use by GCD and would reduce project benefits and reliability.

DNRC used a computer model of Flint Creek streamflows to estimate the Boulder Creek project's effect on shortages to downstream water users (see Table 4-15). DNRC's estimates indicate that users of water from the Allendale Canal and various other Flint Creek water users might be impacted by the operation of GCD's proposed project. Note that these are estimates only and are not a determination of adverse effect. Such a determination can be made only after a contested case hearing.

(response 438, continued)

Table 4-15
Estimated Allendale Canal Shortages
With and Without Proposed Boulder Creek Project[a,b]

Estimated Allendale Canal Shortages (cfs)

	JULY		AUGUST	
Year	Without Project	With Project	Without Project	With Project
1954	0	9.6	0	0
1957	0	10.5	0	0
1959	0	3.7	0	0
1960	13.1	23.5	0	0
1961	11.2	11.4	15.8	10.7
1962	0	8.3	0	0
1966	25.9	37.2	0	0
1967	0	5.6	0	0
1971	0	1.3	0	0
1973	63.1	69.2	57.3	53.1
1974	0	8.9	0	0
1977	40.6	40.8	38.9	33.7
1979	17.0	34.2	0	0
1985	20.3	24.3	0	0
AVERAGE[c]	5.3	8.0	3.1	2.7

a Estimated from DNRC Flint Creek Hydrologic Model for 1951 through 1986.

b Shortages during all other months of study period were estimated to approximate zero.

c Averages shown include zero shortages not listed here during remainder of the study period.

439 • p. 43 -- Some description of how the 170 acres for sediment accumulation and the "conservation pool" help mitigate decreased storage capacity over 50 years would be helpful. The document should include some analysis of incremental changes in capacity and how they effect project operation and cost effectiveness over time.

440 • p. 80-81 -- Cost estimates use a discount rate of 4.6 percent, which as stated above, is extremely unrealistic. Cost estimates should have covered a range of possible discount rates, say four, eight and 12 percent. No bank would lend money for this (or any) project at 4.6 percent, nor is it likely that inflation will average under 4.6 percent in the next 50 years, so why should this project be discounted so low?

441 • p. 89 -- The only source cited for evaluating return flow values to Flint Creek is Brustkern (1986). The same research was used in the DEIS. Is a single non-site (or region) study adequate for these reservations when return flows are such a critical issue? We think more research is needed in this area.

Thanks for your consideration.

Sincerely,

Bruce Farling

Bruce Farling
Deputy Director

439. The elevation of the 170-acre sediment pool would be lower than the outlet and would not provide useful storage. The 170 acre-foot conservation and sediment pool would serve as a refuge for resident fish populations in the event that the reservoir is otherwise completely drawn down. Over time, sediments will be transported to and deposited in the conservation and sediment pool reducing its capacity. Eventually, the conservation and sediment pool will fill and sediment will begin to accumulate in the "active" storage of the reservoir. This reduction in storage space may reduce the reservoir's ability to deliver water to the project during some years. Due to lack of data, DNRC did not attempt to evauate the sedimentation rate of the reservoir and consequently could not analyze the project's effectiveness at incrementally reduced storage levels.

440. Both the cost estimates and the discount rate presented on pages 80 and 81 of the addendum have inflation removed from them. A discount rate of 4.6 percent after inflation is approximately equal to a discount rate of 9.6 percent with 5 percent inflation. DNRC's analysis could have been performed with estimated inflation included in both the dollar amounts and the discount rate, but the results would have been exactly the same.

441. See the responses to comments 267 and 268.

C. BRUCE LOBLE
ATTORNEY AT LAW
POST OFFICE BOX 1145
HELENA, MONTANA 59624

POWER BLOCK, SUITE 4N
AT SIXTH & LAST CHANCE GULCH

RECEIVED
MAY 0 1 1990
MONT. DEPT. of NATURAL
RESOURCES & CONSERVATION

442-5555
AREA CODE 406

April 30, 1990

John Tubbs
Department of Natural Resources
and Conservation
Water Resources Division
1520 E. Sixth Avenue
Helena, Montana 59620-2301

RE: Clark Fork Reservations

Dear Mr. Tubbs:

On page 3 of the Addendum on the Upper Clark Fork Basin Water Reservation Applications Draft Environmental Impact Statement, the comment is made that reservations cannot adversely affect water rights in existence at the time the reservation is granted, "However, a reservation can be used as a basis to object to future permits or changes of existing water rights."

Inasmuch as it is indicated on page 2 of the Draft EIS that a final decree specifying existing rights for the Clark Fork Basin is not expected in the near future, you should also indicate in the EIS that a reservation granted the Department of Fish, Wildlife & Parks before the existing water rights are fully adjudicated will probably be asserted as a basis to object to pre-1973 historic water rights during the water adjudication process. 442

Many water users do not fully comprehend that the term "existing rights" is a term that will be fully defined only after the future final decree is eventually issued in the state adjudication process. Therefore, although reservations cannot adversely affect water rights in existence at the time the reservation is granted, the reservations will likely be asserted by DFWP to grant it standing to define and interpret what those eventual existing water rights will be. If DFWP is successful in that argument then it would likely seek to reduce or limit the scope and extent of those existing water rights which it believes may not have been historically utilized. The cost of defending "existing" water rights against a DFWP objection might be significant.

Sincerely yours,

C. Bruce Loble
CBL:ps

442. Any water right holder can object to pre-1973 claims during the adjudication process (85-2-233(1)(a), MCA). If DFWP's reservation requests are granted, the agency would gain this right. The likelihood of DFWP objecting during adjudication is unknown.

RECEIVED

MAY 0 1 1990

MONT. DEPT. of NATURAL RESOURCES & CONSERVATION

John E. Tubbs
RE: Clark Fork Reservation
Dept. of Natural Resources & Conservation
Water Resources Division
1520 East Sixth Avenue
Helena, MT 59620-2301

Dear Mr. Tubbs:

The following are comments from the Headwaters RC&D Agricultural Water Users Committee concerning the completed addendum to its draft environmental impact statement on reservation of water in the Clark Fork basin above Milltown Dam.

Having reviewed the addendum to the draft environmental impact statement, the Headwaters Agricultural Water Users Committee wishes to reflect these comments.

It is our impression that economics have been over emphasized. The direction taken in the draft is towards the
443 economic feasibility of building dams not towards environmental impacts of reserving water. Granite County Conservation District had applied for the right to reserve water for future use not for a permit to construct a dam.

Secondly, the price which was quoted to the Granite County Conservation District from Washington Construction to build a dam
444 was considerably less than the figures used by the DNRC. If the figures that Washington Construction quoted were used, the dam would have been an economically feasible project.

In addition the Fish and Game did not have to quantify the
445 economics of their reservation while Granite County Conservation District had to reflect an economically feasible project as if it would be constructed at the time the reservation was granted.

The general overall consensus was it was anti-agriculture
446 and anti-storage, and an insult to Granite County Conservation District.

In summary, the EIS does not look to the future benefits of
447 water development. Many of the benefits that are accrued through storage are not adequately reflected in the EIS.

Sincerely,

Dan Ueland

Dan Ueland
Chairman

443. See the response to comment 465.

444. Using GCD's cost estimates obtained from Washington Construction and others, the Boulder Creek project would still be economically infeasible, as described in the addendum at the bottom of page 60 and the top of page 61. GCD states in its application (1987) that the project is infeasible at today's costs (see page 8 of the addendum).

445. DNRC presented information on the benefits and costs of DFWP's reservation requests in the draft EIS. The Board must weigh benefits and costs for all applicants, including GCD and DFWP. DNRC was better able to quantify the costs and benefits of GCD's requests because the end results—agricultural commodities such as hay and beef—have established market prices. DFWP's requested reservations are intended to maintain aquatic habitat and recreational opportunities, neither of which currently has a price set by a market.

446. See the response to comment 212.

447. The future impacts of GCD's proposed storage project, including costs and benefits, are described in Chapter Three of the addendum. The topic of storage as a water management tool is beyond the scope of this EIS and is being addressed by the State Water Plan during the current planning cycle. A brief discussion of storage as it relates to DFWP's requests is found in response to comment 33.

COMMENTS ON ADDENDUM TO

DRAFT ENVIRONMENTAL IMPACT STATEMENT

UPPER CLARK FORK BASIN

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Executive Summary - Third ¶: A conclusion is reached that the Boulder Creek reservoir "would adversely affect fish populations in Boulder Creek". Studies completed by the DFWP in Flint Creek below Georgetown Lake show development of an excellent fishery below the reservoir (see Section 3.1.3. Flint Creek Project, Draft Application to Surrender License, MPC, April 1987). "Heavy brush cover, stable flow and possible elevated temperatures are
448 contributing factors to the excellent trout production in this section". The DFWP reports in their application, on page 109, that "The low population densities observed are probably the result of a combination of low seasonal temperatures and reduced solar radiation, which contribute to low productivity". Temperature and nutrient changes associated with the reservoir may actually augment the fishery below. A more detail study is necessary before the conclusion can be reached that the fishery will be adversely affected by Boulder Creek Reservoir.

Executive Summary - Fourth ¶: We believe that DNRC has
449 overestimated project costs, compared to that achievable by private enterprise and underestimated benefits, e.g., alfalfa yields. This premise will be explained in more detail later. Reservoirs have a long life once constructed. With the low sediment yields of this drainage, this reservoir would provide service hundreds of years
450 into the future. Given the long life of the reservoir and dam, it would seem reasonable that economic analysis should be based on at least a 100 year term, not 20, 50 or 70 years as in the EIS. The public can participate in its construction, allowing this investment to be amortized over a longer period than possible otherwise. The history of state and federal subsidies is evident. Study of past reclamation projects show that irrigation typically pays about 26% of allocated costs - the balance is paid by power
451 revenues and other subsidies(see The Formulation and Implementation of U.S. Reclamation Policy: An Historical and Empirical Review, H. Burness et. al. July, 1979). Subsidies have been provided to irrigators by the State and the SCS in this basin in construction of at least two reservoirs and numerous other projects. Subsidies of 50% of project costs are not unusual even toady, e.g. Wyoming Water Development Commission storage projects. The economic analysis is much too stringent as one of the stated purposes of the
452 reservation is to allow time for economic conditions to once again become favorable for agriculture. Considering inflation, the seemingly large investment in this project today may be a considered a bargain 100 years from now.

448. As an irrigation project, GCD's proposed Boulder Creek dam would not operate in the same manner as Georgetown Lake, which serves several purposes. The "stable flow" cited for Flint Creek below Georgetown Lake would not occur below GCD's proposed dam on Boulder Creek. As indicated by DNRC's flow estimates on page 66 of the addendum, flows immediately below the Boulder Creek reservoir would decrease by an annual average of 46 percent, and would drop from an average of 17 cfs to 1 cfs in September. Average monthly flows at Maxville would decrease by 25 to 71 percent. While warmer flows during winter could benefit the fishery, this would likely be offset by the reduced flows, particularly in July, August, and September. The impact to the fishery is clear; further study would be needed to precisely identify its severity.

449. See the responses to comments 306, 444, and 461.

450. DNRC analyzed the economic feasibility of both of GCD's proposed projects using a 70-year project life. DNRC chose 70 years for two reasons. The first was that using a longer life would have a negligible effect on the results. The present value of a constant stream of benefits over 70 years is 97 percent of the present value of the same stream of benefits extended to 100 years. The second reason was that DNRC was unwilling to speculate about prices and costs further into the future. GCD used a 50-year project life in its application (GCD 1987).

451. Until the early 1970s, the U.S. Congress supported water projects, and irrigation projects in particular, to settle and develop the arid West. The policy of the federal government was to subsidize water development. This policy, however, appears to have changed. Subsidies have become more difficult to obtain because of existing crop surpluses, environmental problems associated with new projects, and the national deficit. Nonetheless, Congress may agree to subsidize part of the costs of water projects in the future if it is determined that they would be in the national interest.

If GCD can obtain enough subsidies, the project can be made financially feasible. But subsidies would have only a small impact on whether the project is economically feasible. Every dollar of subsidy that GCD receives from the state or federal government must be raised through taxes or an increase in state or federal debt. Subsidies would decrease GCD's direct project costs only by shifting those costs to taxpayers.

452. Inflation is not relevant to the economic analysis. See the responses to comments 440, 443, and 450.

Public Interest-Page 8, First ¶: If the term of the repayment is set to 100 years, the GCD derived project cost at 5% interest is $710,724, including $76,300 for O&M. This is very close to the $708,900 in direct benefits calculated by GCD. Using 4.6% (discount rate allowing for inflation) and a 70 year term, as found in Appendix B of the Addendum EIS, the GCD project cost would be
453 $681,515, annually; a positive benefit/cost ratio. If costs are doubled, as claimed by DNRC, a 50% cost share may be necessary. Given the history of irrigation development in the west, we believe it is prudent to give GCD the benefit of doubt in an cursory economic analysis such as this one. The engineering cost estimate and the assessment of future economic policy are not detailed enough at this point to do otherwise.

Table 2-1. Fishing Estimates-page 26: We note that East Fork Reservoir and Georgetown Lake show considerably more Angler
454 Days/year than Boulder Creek (48,833 vs. 938). Much of the Flint Creek use (4,382) is below Georgetown Lake. We conclude from this data that a reservoir on Boulder Creek has the potential to increase Angler Days, not decrease use as eluded to in the EIS.
A poor fishery may be improved by warmer flows. Optimum recreation
455 use may require a different operating scenario than proposed by GCD. This scenario, including the public obligation to share in cost of this benefit, should be presented as an alternative in the EIS.

453. The future benefits and costs of GCD's proposed project are uncertain. DNRC explicitly took that uncertainty into account in its analysis of economic and financial feasibility. See the response to comment 465 and pages 60-61 of the addendum.

454. The potential of any reservoir to provide recreation opportunities is determined in part by the size of the reservoir and how it is managed. Since GCD's proposed use of water is for irrigation, it is likely that reservoir drawdowns for this purpose would limit recreation potential.

The East Fork Reservoir has nearly twice the capacity of GCD's proposed reservoir on Boulder Creek. Although the reservoir level fluctuates depending on snowpack, weather, and irrigation demand, drawdowns are not typically as severe as would occur on Boulder Creek. The proposed Boulder Creek reservoir would be drawn down to less than 185 af during October in 2 years out of 10.

Georgetown Lake, with its 40,000-plus angler days per year, is a 2,850-acre reservoir with a relatively stable volume. FERC license requirements regulate levels at Georgetown Lake, and recreation objectives have been established for this reservoir. One of the uses of reservoir water is for irrigation, and MPC is required to discharge water at a rate of 30 cfs or more during the irrigation season into Flint Creek, providing a relatively stable flow pattern in upper Flint Creek. In contrast, GCD's proposed Boulder Creek project would dramatically alter streamflows in Boulder Creek in most months.

DNRC's analysis indicates that monthly streamflows below the Boulder Creek dam would be reduced by 29 to 94 percent in the summer and fall. This would have a substantial detrimental effect on aquatic habitat between the dam and the South Fork of Boulder Creek, which could, in turn, adversely affect fishing opportunities.

455. GCD's proposed use of water stored at the Boulder Creek site is for irrigation, not recreation, and any releases for other uses would further reduce the feasibility of the proposed project. If GCD's reservation request is granted, a second, more detailed EIS may be required before the project is constructed. This second EIS could incorporate information from more final designs and operating plans, including any new plans by GCD for optimizing recreation.

456 Land Use-Page 27, Fourth ¶: Although 710 acres are claimed to be irrigated on Boulder Creek, it is probable that closer to 238 acres are actually irrigated in any one year. With return flows, releases for the diversion requirements of 238 acres could satisfy the needs for all 710 acres. Not enough detail is presented in the EIS to make this determination.

457 Socioeconomic Conditions-Pages 28 and 29: It is clear from the data presented in this section that agriculture is important to the economy of Granite County. The availability of water is important to the future of agriculture, a fact glossed over in the EIS.

458 Water Quality-Page 43, Third ¶: Boulder Creek, as the name implies, is a heavily armored channel. We question that sediment levels would increase substantially with the release of irrigation flows, given the boulder and cobble substrate of the channel bottom.

459 Fisheries-Page 44, Second ¶: The effects of the reservoir on the fishery are not quantified. Changes in population levels probably can not be determined without a detail study. The statement that the reservoir will have a "substantial detrimental effect on the aquatic habitat in Boulder Creek between the dam and the South Fork of Boulder Creek" is not substantiated by factual documentation in the EIS.

456. DNRC's water right records indicate that a total of 770 irrigated acres are claimed in association with water rights on Boulder Creek. But regardless of the number of acres, return flows from these lands would enter Flint Creek and would not be available for rediversion from Boulder Creek.

457. Comment noted. In a highly appropriated basin such as the upper Clark Fork, water availability is an important concern of all water users, including ranchers and farmers.

458. The sedimentation concern discussed on page 43 of the addendum refers to Douglas Creek rather than to Boulder Creek. Douglas Creek is a separate tributary to Flint Creek. Sediment levels would increase along the reach of Douglas Creek that is used to convey irrigation water to other segments of the canal. These conveyance flows would be larger than the natural, baseline flow of Douglas Creek during the irrigation season, and the creek channel would erode until its size has adjusted to the larger flows. This erosion is the source of the sediment mentioned on page 43 of the addendum.

459. Since the addendum was published, DNRC collected additional flow data and studied changes in stream depth and width as flows changed in Boulder Creek to further analyze the effects of changing flows immediately below the proposed dam site. September flows now average 17 cfs with maximum riffle depths ranging from approximately 6 to 10 inches. In its application, GCD proposed reservoir releases of 1 cfs in September and 5 cfs during the winter months. DNRC's estimates indicate that a flow of 1 cfs would provide cover only in deep pools. In the three riffles studied by DNRC, a flow of 1 cfs would reduce the estimated maximum depth to less than 5 inches at one riffle, and the estimated maximum depth in the other riffles would be about 2 inches. At these flows, fish moving between pools would be vulnerable to predation.

Stream width at the riffles studied would begin to decrease as flows are reduced below about 10 cfs and would decrease rapidly as flows drop below 4 or 5 cfs. Riffle habitat would be adversely affected at flows below 10 cfs, and would be severely affected as flows drop below 4 or 5 cfs. Although a precise relationship between fish populations and riffle habitat has not been demonstrated in Boulder Creek, the marked reduction in flows due to GCD's proposed project would likely severely reduce riffle habitat, which would likely adversely affect fish populations.

Fisheries-Page 44, Fifth ¶: The last sentence states that additional instream flow releases may be required to maintain downstream flows for Bull trout. The EIS does not discuss the
460 impact on economic feasibility of the reservoir given the scenario of an instream flow granted much higher than needed to maintain the existing fishery. GCD has proposed a 5 cfs wintertime release and DFWP's is requesting a 20 cfs flow at the mouth. Depending upon inflow from tributaries downstream, a potential conflict exists.

Land Use-Page 47, Fifth ¶: Alfalfa yields are stated to be 3 tons/acre in this paragraph, compared to 2.5 tons/acre in the first EIS. Calculations from data presented on page 50 indicate 2.5 tons/acre (10,000 tons of alfalfa/=4,000 acres). Economic calculations appear to based on 2.5 tons/acre but costs reflect management for a higher yield. A good relationship exists between
461 evapotranspiration and alfalfa yield. This relationship was explored by DNRC using studies at Kimberly, Idaho; Oakes, North Dakota; Fallon, Nevada and Flowell, Utah in the Missouri River Water Reservation Applications. Using the same procedure as DNRC used in the Missouri, we calculate yields ranging from 3.6 tons/acre at Phillipsburg to 4.2 tons/acre at Drummond. As reported in the GCD application, yields of 4.5 tons/acre have been measured in the better fields consistently. Yields used by DNRC are questionably low for economic feasibility analysis.

460. As proposed, water would be still be available for full-service irrigation on GCD's project lands in roughly 8 or 9 years out of 10, even after supplying water to the existing acres of irrigated land on Boulder Creek. However, if DFWP is granted an instream reservation with an earlier priority date than GCD's, then 20 cfs would have to be released for instream flow. This would reduce the amount of water available for use on project lands; full-service irrigation would be possible in only 3 or 4 years out of 10. This would undoubtedly reduce the economic feasibility of GCD's proposed project.

461. See also the response to comment 306. DNRC used essentially the same methodology to analyze GCD's projects as was used to prepare the Missouri River reservation applications, but did use higher costs and yields for the Missouri applications. DNRC revised its yield estimates upwards after finding additional data on the response of alfalfa yields to water availability. DNRC's Missouri River methodology gives an average yield at Philipsburg of 3.4 tons per acre rather than the 3.6 tons estimate given in the comment.

DNRC based its on-farm costs for GCD's projects on data supplied by the district. This information was based on two farms—one with a lower level of management and the other with a higher level of management. In the Missouri applications, DNRC's on-farm costs are based on a level of management higher than those used to analyze GCD's projects.

Material used by GCD's consultant to prepare its application indicates that GCD's yield estimate is based on one measurement of yield from one field. This estimate is much higher than average Granite County yields (see below), and GCD's cost estimates indicate that not all project participants will practice the level of management needed to obtain maximum yields. DNRC did analyze the Boulder Creek project using the yields and costs used in the Missouri River applications. The project repaid GCD's cost estimate in 7 out of 300 scenarios and repaid less than 60 percent of DNRC's cost estimate in all scenarios. With the lower yields and costs used in the addendum, the Boulder Creek project repaid GCD's cost estimate in 92 out of 300 scenarios, but did not cover DNRC's cost estimate in any scenario.

Production records for Granite County from 1964 through 1988 indicate that the average annual yield per acre was 2.54 tons (Montana Department of Agriculture 1989). The highest annual average for that 25-year period was 3.3 tons per acre. In order for the project lands to consistently achieve the yields suggested in this comment, water availability, management practices, and growing conditions would need to be considerably above average for Granite County.

462 Long-Term Economic Effects- Page 51, Fifth ¶: Operation of the reservoir presented in the EIS shows adequate water to be available for the project (see Appendix A). The biggest impact on water availability is the level of instream flows granted DFWP, not existing uses of Boulder Creek and Flint Creek water. This long-term economic effect on GCD is not discussed in the EIS.

463 Other Economic Effects- Page 51, First ¶: Data for Georgetown Lake and East Fork Reservoir would indicate that potential exists for a increase in development of recreation activity, not a decrease as stated in this paragraph. More study is needed before this statement can be supported.

464 Deny GCD's Request or No Action- Page 58, First ¶: The last sentence states that if the Board denies GCD's request and grants the DFWP request, there would not be enough water left un-allocated in Boulder Creek for the GCD irrigation project. There would still be potential for storage of high flow water with the granting of liberal instream flows but the project economic feasibility may be impacted. Our studies show that shortages would occur 5 years out of 40 with requested instream flows, instead of 2 years out of 40. If a water year like 1961 were to occur again, shortage would increase from 1,480 AF to 3,518 AF for a project of the same size. It is extremely important that the instream flow values in Boulder Creek be set at a minimum value, not an optimum value.

462. The data presented in Appendix A of the addendum indicate only that water is physically available in Boulder Creek. These estimates do not take into account whether existing claims and permits on Boulder Creek, Flint Creek, and the Clark Fork main stem already have rights to the water GCD proposes to divert. The only water rights that were explicitly accounted for are associated with 238 acres of irrigated land near the mouth of Boulder Creek. There are 34 other water right claims and permits on Boulder Creek, 125 on Flint Creek, and many more on the Clark Fork, including large hydropower rights.

DFWP's instream flow request on Boulder Creek is for a year-round flow of 20 cfs and all flows from January 1 to April 30 of each year. If DFWP receives an earlier priority date than GCD, then GCD's diversions would conflict with DFWP's reservation in 9 months of the year, as explained on page 61 of the addendum. This would make GCD's Boulder Creek project even more infeasible.

463. Fluctuations in reservoir volume would be large at GCD's proposed Boulder Creek site, with as much as a 73 percent drop from July levels to October levels in a mean flow year (see the response to comment 414). Surface area of the reservoir would vary from less than 10 acres up to 145 acres. Such large fluctuations would not be conducive to maintenance of a reservoir fishery, access of boats to the water, or development of shoreline facilities. In fact, shoreline development at the Boulder Creek site would be hampered by the steep slopes, a feature not found at either Georgetown Lake or the East Fork of Rock Creek reservoir. See also the responses to comments 455 and 480.

464. See the response to comment 460.

May 1, 1990

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MONT. DEPT. of NATURAL RESOURCES & CONSERVATION

John E. Tubbs
RE: Clark Fork Reservation
Dept. of Natural Resources & Conservation
Water Resources Division
1520 East Sixth Avenue
Helena, MT 59620-2301

Dear Mr. Tubbs:

The following are comments from the Granite County Conservation District concerning the completed addendum to its draft environmental impact statement on reservation of water in the Clark Fork basin above Milltown Dam.

Having reviewed the addendum to the draft environmental impact statement, the Granite County Conservation District has decided that some comments are in order. Rather than becoming too specific, our comments will reflect our overall views of the proposed water reservation and the EIS draft.

It is our strong impression that economics have been over emphasized. The direction taken in the draft is towards the economic feasibility of building dams not towards environmental impacts of reserving water. Granite County Conservation District has applied for the right to reserve water for future use not for a permit to construct a dam. The needs of the future should be the issue not the feasibility of constructing a project twenty or thirty years from now. The feasibility of reserving water for future storage should not be determined solely by today's economics. In effect this is speculating that the economy in future years will be the same as today's. 465

It is understood by Granite County Conservation District that in order to reserve water, a plan that is defensible against downstream claims must be presented. This plan needs to show beneficial use in the future not economic feasibility in today's dollars.

The draft EIS conveys the impression that reserving water for future storage projects is not in the interest of the State of Montana. 466

Is the only economically feasible use of Montana's water resources in the future non-use? Downstream interests must be pleased with Montana's lack of protection of its water resources. They have only to bide their time, and the resource will be handed to them. 467

Sincerely,

James Dinsmore
Chairman
Granite County Conservation District

465. The Board must consider economic feasibility when making a decision on whether to grant a reservation, as required by the Administrative Rules of Montana (36.16.107B). The EIS assesses what impact the project would have on the county economy (as required by ARM 36.2.529(4)(c,e, and f)) and presents relevant information to the Board for its deliberation of whether the project would be in the public interest (as required by ARM 36.16.107B(4)). Economic analysis also is required by MEPA.

DNRC's economic analysis is based on current and historical information and computer modeling estimates. This is the best available information given that future economic conditions are unknown. DNRC used a computer model to forecast alfalfa and grain prices, crop yields, and crop production costs for 70 years. Project income was computed for 300 possible combinations of crop prices and streamflows into the reservoir. These 300 scenarios included combinations of high prices and abundant water supplies. Based on DNRC's cost estimate of $30.4 million, the proposed project did not pay for itself in any of the 300 scenarios. Only 92 of the 300 scenarios indicated that project income would cover GCD's cost estimate of $14.2 million.

In the 96-page addendum, the economic discussion takes up about 10 pages. The addendum (and draft EIS) also describes the project's beneficial and adverse effects on water quantity, water quality, fisheries, recreation, vegetation and wildlife, land use, and earth resources.

466. The draft EIS and addendum address only the specific projects contained in GCD's application. See the responses to comments 212, 446, 447, and 451.

467. Many of Montana's streams are heavily appropriated and already support a variety of economical water uses. With such competition for water, it may be difficult to establish new uses. However, where water is available, water rights continue to be issued to uses that meet the state's criteria. Maintenance of instream flow for fish, wildlife, and recreation is defined as a beneficial use in Section 85-2-102, MCA, though the development of water rights for these uses has historically lagged behind most consumptive use development in Montana.

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Postmarked May 1 1990

Murray Carpenter
402 S. Third W.
Missoula, MT 59801
April 30, 1990

John Tubbs
Department of Natural Resources and Conservation
Water Resources Division
1520 East Sixth Avenue
Helena, MT 59620-2301

Dear Mr. Tubbs,

I am writing in comment to the addendum to the draft environmental impact statement on water reservation applications in the upper Clark Fork basin. Thank you for extending the public comment period. I have reviewed the document, and the original DEIS, thoroughly, and have the following comments to make about GCD's reservation request and the proposed Boulder Creek reservoir.

The most striking issue is the project's apparent lack of economic feasibility. The fact that the project would be dependent on federal or state subsidies, which are increasingly
468 difficult to obtain, makes it very unlikely that the project will be undertaken. If the project is undertaken, all of the benefits would accrue to a small group of people, while many of the indirect project costs would affect a much larger segment of the population.

Indirect project costs appear to be very high. The possible
469 reduction in the bull trout population is particularly troubling because their habitat is so limited. Another indirect cost that
470 is hard to quantify is the value of Boulder Creek as a fishery. It seems probable that most of the 938 angler days per year would
471 be lost. Additionally, there would be reduced flows in Flint Creek and the Clark Fork during the winter months when the flows
472 are needed to dilute pollutants. Granting GCD's request would keep the water from being used for more beneficial uses. One such use might be DFWP's requested instream flow reservation.

I believe that granting the reservation to GCD would not
473 serve the public interest, and I would encourage you to deny their request. Thank you for considering the above comments.

Sincerely,

Murray Carpenter

Murray Carpenter

468. See the response to comment 451.

469. See the response to comment 419 regarding bull trout habitat.

470. DNRC's analysis indicates that GCD's proposed project would cause a substantial, detrimental effect to aquatic habitat immediately downstream from the dam. It is not possible to predict, however, how severely this would affect fish populations in Boulder Creek. Similarly, DNRC cannot correlate these impacts to specific changes in fishing opportunities or actual angler use, though reductions in both opportunity and use are possible. Table 2-1 on page 26 of the addendum gives only a rough indication of Boulder Creek's value to anglers compared to other local streams.

471. Comment noted. Additional information on water quality and dilution flows is presented in Chapter Three of this final EIS.

472. The reservations requested by GCD and DFWP on Boulder Creek would conflict. The Board may choose to grant one while denying the other, condition one or both, subordinate one to the other, or simply give one an earlier priority date.

473. Your comment is noted and by its inclusion in this EIS will become part of the legal record presented to the Board. The Board, and not DNRC, will act upon the reservation requests examined in this EIS.

PUBLIC MEETING COMMENTS

Comments 474 through 490 were collected at the public meeting on the addendum in Drummond in April 1990.

474. Is GCD required to carry liability insurance on the project?

474. No, GCD would not be statutorily required to carry liability insurance on the Boulder Creek project. If the dam fails, the dam owner could be subject to civil suit and/or criminal prosecution. Property owners who suffer damage or losses may choose to sue the responsible party. However, if the dam is determined to be a high-hazard dam as defined by the state Dam Safety law, GCD must obtain a permit from DNRC. If the dam is constructed and operated in accordance with this permit, the dam owner is relieved of liability for damages except due to negligence. (§ 85-15-305(2); 85-15-501, MCA).

475. Why can't the project store high spring flows and floodwaters and then release water periodically into Boulder Creek to supplement flows during dry months? There may be some project lands that can't be feasibly irrigated, and the water could go into Boulder and Flint Creeks to satisfy both the junior irrigators and fish who don't always get enough water during low flows.

475. GCD's proposed project on Boulder Creek was designed, in part, to store high spring flows and would rely on them for irrigation. The project was designed to deliver water solely for the benefit of irrigation. Project feasibility would be further reduced if water was released for other purposes or if fewer acres were irrigated. Granting GCD less water than it requested would produce similar results; see page 58 of the addendum.

It is possible that some of GCD's proposed irrigated lands are less feasible than others. For instance, the proposed irrigated lands in the Barnes Creek drainage would need a longer canal to supply water. If all other factors (slope of the land, soils, etc.) are similar, then it is likely that omitting these lands could improve the overall feasibility of the proposed project while simultaneously making water available in Boulder Creek for other uses. However, neither GCD nor DNRC analyzed the incremental costs and benefits of omitting these or any other lands from the project.

476. GCD's proposed canal goes through my property (in section 3), and I could probably irrigate about 100 acres, in parcels, which might make a difference between making a living or going out of business.

476. If GCD is granted a reservation and builds the project, the district will distribute the requested 13,998 af of water to its co-operators. If project construction is delayed for 10 or 20 years, however, ranches on the verge of going out of business now may not survive to benefit from the reservation. GCD has indicated in its application (1987) that such a delay is likely due to financial constraints.

477. Why don't they put a dam on Flint Creek?

477. No application was filed for a dam on Flint Creek. GCD is seeking a water reservation on Boulder Creek because it was seen as a likely source of unappropriated water.

478. This dam is going to be a silt trap. Just look at the beaver ponds up Copper Creek or Little Boulder Creek. In about 10 or 15 years this dam will be silted in and won't be fit for anything.

478. See the response to comment 439.

479. Who would pay to build and maintain the road from Maxville and Princeton? Would taxpayers bear any burden?

479. Building the road would probably be part of GCD's project cost. If GCD obtains state or federal subsidies to build the project, taxpayers might bear this cost. It is uncertain who would pay for long-term maintenance of the road.

480. Would the new road extend all the way around the reservoir?

480. In its application, GCD did not include plans for relocating the Boulder Creek road. A study of slope stability would be needed to determine where to relocate the road or whether it could circle the reservoir. The steep side slopes at the site may prohibit any road cuts from being placed around the reservoir and to maintain access to Princeton, the road may have to come up another drainage. See also pages 46 and 47 in the addendum.

481. Would the dam hold enough water to meet the irrigators' needs despite water losses from canal seepage? Are those losses included as benefits received by the ranchers?

481. GCD designed the reservoir to supply water to irrigators despite canal seepage and other losses. In fact, GCD estimated that to supply the 1.08 af per acre needed for the crops, approximately 3.42 af per acre would need to be diverted at the headgate of the proposed canal. The difference between these values—2.34 af per acre—is water lost in various ways. By far the largest loss GCD accounted for was canal seepage at 1.24 af per acre. Other losses included on-farm losses (0.58 af per acre) and operational losses (0.52 af per acre).

DNRC inspected the soils along the canal route and also estimated canal seepage losses. DNRC found that GCD's canal seepage loss estimates are reasonable.

482. Boulder Creek freezes from the bottom up. So where will the fish go when GCD's project reduces flows and the creek freezes?

482. Ice will form on the surface of standing water, but in flowing water ice will sometimes freeze to the stream bottom first, a condition known as anchor ice formation. Icing could add to winter stress for fish in the stream below the dam, particularly in years when reservoir levels are low at the end of the irrigation season. Winter releases would be cooler than in years with high water levels, and would contribute less to keeping the stream open.

In years when reservoir water levels are high at the end of the irrigation season, winter releases would be warmer than the stream runs at present and would reduce the chance for anchor ice formation immediately below the dam. The fishery would benefit from the release of warm water, but aquatic habitat would be adversely affected because winter flows would be reduced by an average of about 72 percent in a median flow year. Further study based on the finalized operating plan would be needed to determine whether anchor ice formation or low flows would be most limiting as one moves downstream on Boulder Creek.

483. Please address the flood control benefits of the dam on Boulder Creek.

483. See the response to comment 487.

484. What preliminary work has been done to find a foundation for both ends of the dam? Will they put cement in the middle and dirt fill in both sides? Will GCD stockpile dirt if it ever started washing out?

484. The proposed dam abutments have been bored by the SCS. Looking downstream at the site, the left abutment was bored starting at a height of 78 feet above the creek to a depth of 18 feet, and a second hole 8-feet deep was bored at a height of 92 feet. The right abutment was bored 30-feet deep from a height of 46 feet above the creek (USDA 1978a). These corings indicate that the stream channel may have shifted over the years from beneath the right abutment to its current location along the left abutment. Unconsolidated material above the bedrock consists of clays, unweathered shales, and some pockets of gravel.

As proposed in GCD's application, the design calls for a 145-foot high earthen embankment, with a 190-foot wide concrete spillway next to the left abutment (GCD 1987). Emergency procedures would require that suitable repair materials be identified and stockpiled at the dam site, such as clay fill and large rock rip rap.

485. Converting 4,000 acres of pasture to irrigated cropland will be a boon to the county's tax revenues. And the project will employ more people; if a rancher goes from irrigating 400 acres of hay to 800 acres, he'll have to hire another person. This was left out of the addendum's cost breakdown.

485. DNRC's analysis of the project's effect on county tax revenues and employment can be found on pages 50 through 54 of the addendum. No significant long-term increase in employment is predicted, and the county's total taxable value would increase by 0.6 percent if the 4,093 acres of rangeland is converted to irrigated cropland.

486. Will the dam be designed to facilitate fish migration?

487. The EIS should address how the project will reduce flood flows and affect stream channel morphology and formation.

486. GCD's proposal does not include facilities that would allow fish passage. Such provisions could be incorporated in the dam design, but would increase project costs. Existing beaver dams may already limit fish movement in Boulder Creek.

487. The addendum did indirectly address how flood flows would be affected by GCD's proposed reservoir on Boulder Creek. The tables on pages 66 and 67 in Appendix A (in the addendum) provide estimates of monthly flows in Boulder Creek both with and without the reservoir. These estimates indicate that the reservoir would reduce the highest 20th percentile monthly flow, during June, by 29 percent immediately below the proposed dam and by 25 percent at Maxville.

The highest estimated monthly flow from 1951 to 1986 was 380 cfs in June 1975. With the dam in place, this peak monthly flow would have been reduced by 17 percent.

The actual amount of flood control provided by the proposed reservoir cannot be determined until the spillway design and operating plan are known. Freeboard, or the height of a dam above its spillway, and spillway design are important factors in reducing peak flows as a flood passes through a reservoir. The design and operating plan of a dam should consider these factors if flood control is one of the purposes to be served by the dam.

Several homes east of the Boulder Creek road in Maxville lie within the 100-year floodplain as mapped by the Federal Emergency Management Agency (FEMA 1982). Other homes upstream from Maxville and below the damsite may also lie within the floodplain. These properties would likely benefit from any flood control provided by the proposed dam.

The dam would probably affect channel morphology (form and structure) in two ways. First, with decreased flows Boulder Creek would be able to carry less coarse sediment. In the long-term, these sediments would accumulate and flatten the slope of the stream. Second, if releases from the reservoir are relatively free of sediment, they may scour the channel immediately below the dam. In general, such scouring action below dams on streams with gravel beds is minor and simply leaves a coarser grade of bed material in the reach. In sum, the project would probably have only a minor impact on channel morphology.

488. If the Clark Fork Coalition and Trout Unlimited want more instream flow, let them buy water from the Boulder Creek reservoir and release it when they want.

488. If another interest group could cover the costs of irrigation income that would be foregone, water could be released for other uses. Otherwise, releases for purposes other than irrigation would decrease project feasibility.

489. DNRC should help pay for the project with some of the $1.6 million it got from BPA when the powerline went in.

489. The $1.6 million in the Rock Creek Mitigation Fund can only be used in the Rock Creek drainage. The fund is not administered by DNRC but by the Rock Creek Advisory Council, which represents the various conservation groups that settled with BPA and a consortium of other utilities over a powerline route that crossed RARE II lands. DNRC has one seat on the seven member council.

490. What portion of the water going by Maxville comes out of the South Fork of Boulder Creek?

490. The contribution of the South Fork to the total flow of Boulder Creek can be roughly estimated as the difference between estimated flows at the proposed dam site and flows measured at the USGS gauge near Maxville. There is some tributary inflow between the dam site and the Maxville gauge that does not come from the South Fork, but this amount is relatively small. Table 4-16 summarizes the estimated mean monthly flows at the dam site (as they would occur if the dam were not built) and measured flows at Maxville.

Table 4-16
Comparison of Boulder Creek Flows at Maxville and Proposed Dam Site
(cfs unless otherwise noted)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	Annual (acre-ft)
Mean Measured Monthly Flow at Maxville [1]	26	26	23	20	20	19	29	119	191	63	20	20	34,780
Estimated Mean Monthly Flow at Proposed Dam Site [1,2]	21	21	19	17	17	16	24	102	165	57	19	17	29,893
Difference	5	5	4	3	3	3	5	17	26	6	1	3	4,887
% of Mean Measured Flows at Maxville [3]	19	19	17	15	15	16	17	14	14	9	5	15	14

1 From Upper Clark Fork Basin Water Reservations Applications Addendum Appendix A, period of record 1951-1986.
2 Mean monthly flows at proposed dam site are those that historically would have occurred—that is, without regulation from the proposed dam.
3 Calculated as difference/mean monthly measured flow at Maxville x 100%.

Written Comments on the Draft EIS:

Laura Mae Jackson
Robert D. Oset
Skyline Sportmen's Association
Montana Wildlife Federation
Bill Burnett
Ron Pierce
John W. Craig
Montana Chap., American Fisheries Society
Five Valleys Audubon Society
Resource Conservation Advisory Council
Champion International Corporation
Alice and Briggs Austin
Gene and Florence Allen
Granite County Water Users Association
Montana Department of Fish, Wildlife & Parks
Donald Tamcke
Robert Evans
Joe Johnston
Marjorie Reistad
West Side Ditch Co.
Washington Water Power Company
K. O. Weaver
Ethel McGillis
Jack A. Perkins
Randall E. Perkins
William F. Murphy
Montana Chapter, Sierra Club
Montana Power Company
Donna and Marlin Gilman
Clark Fork Coalition
Kenneth P. Fleming
Powell County Board of Commissioners
Powell County Extension Office
Madison-Gallatin Chapter, Trout Unlimited
John P. Senecal
Granite Conservation District
Henry J. and Gloria J. Schiele
Deer Lodge Valley Conservation District
John Vanisko
George Grant Chapter, Trout Unlimited
Gary J. Saundemille
Mark and Nancy Connell
Larry Marshall

Written Comments on the Addendum:

Thomas Keegan
Montana Council, Trout Unlimited
Jim and Delores Rose
R. Earleen Adler
Mrs. Grace Lundgren
Kennybelle M. Metcalf
Cathy Romeo
Harold D., Alvina, Randy D., and Richard D. Lundgren
Ron Pierce (See Above — Also commented on original draft)
Washington Water Power Company (See above)
Five Valleys Audubon Society (See above)
Butte District Office, BLM
GCD (see above)
Headwaters RC&D Agricultural Water Users Committee
C. Bruce Loble
Murray Carpenter
Clark Fork Coalition (See above)
DFWP (See Above)
Leonard J. Connors

Oral Comments from Transcripts of Meetings on the draft EIS:

Ed Lord
Flint Creek Water Users Association
Bill Jones
GCD (See Above)
Florence Allen (See Above)
Tom McGowan
Jim Struna
Cy Corlett
Ole Ueland
Ken Fleming (See Above)
Jack Perkins (see above)
Bill Mosier
Tony Schoonen
Bill Homer
Larry Thomas
Peter Nielson
Vicki Watson
Robert Benson
Andy Lukes
Jim Curtis
John Perry
David Sauerbier
George Getz
Orchard Home Ditch Company

Oral Comments at Drummond Meeting on the Addendum:

Jim Dinsmore (see above)
David Johnson
Leonard J. Conners (see above)
Grace and Jim Maehl
Loren Speiser
Montana Council of Trout Unlimited (see above)
Joe Kenast
Sherry Armstrong
Johnson Tuning Fork Ranch
Catherine Swift
Gordon Foster
Ron Montgomery
Tom Baumgardner
Fred Parker

Appendix A
Wetted-perimeter versus Flow Curves

APPENDIX A

Figures A-1 through A-23 show the relationship between wetted perimeter and flow on streams and reaches in the upper Clark Fork basin for which DFWP has requested instream flow reservations. These figures originally appeared in DFWP's application (1987). Each x-y plot is a composite of several riffle cross sections as measured by DFWP (1987). For more information on DFWP's use of the wetted-perimeter method, see DFWP's application and the Amount section under the DFWP heading in Chapter Two of this final EIS. See also the responses to comments 106-109, 185, 190, and 193 in Chapter Four of this final EIS.

FIGURE A-1. The Clark Fork near Deer Lodge.

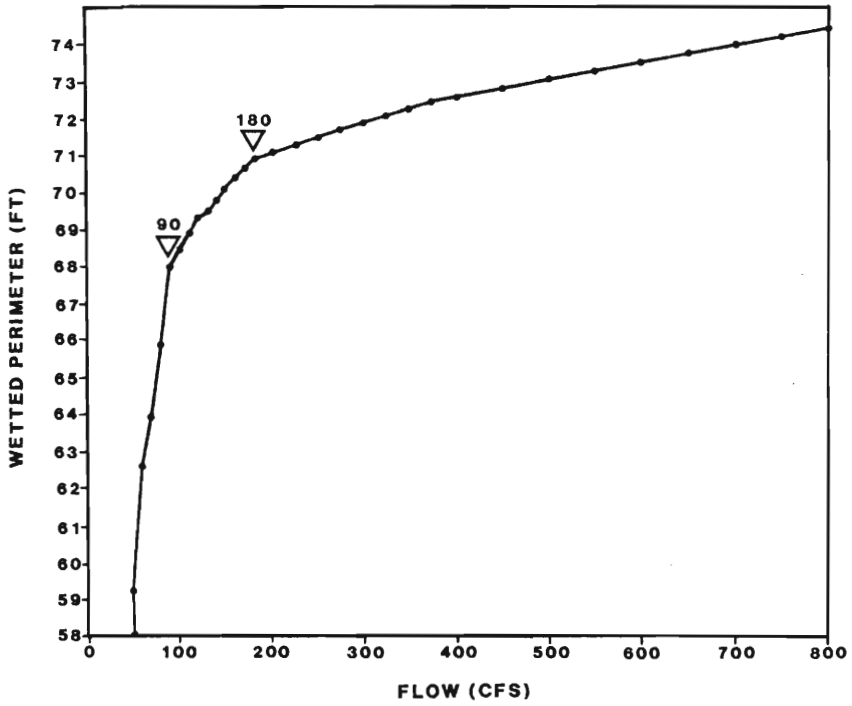


FIGURE A-2. The Clark Fork near Gold Creek.

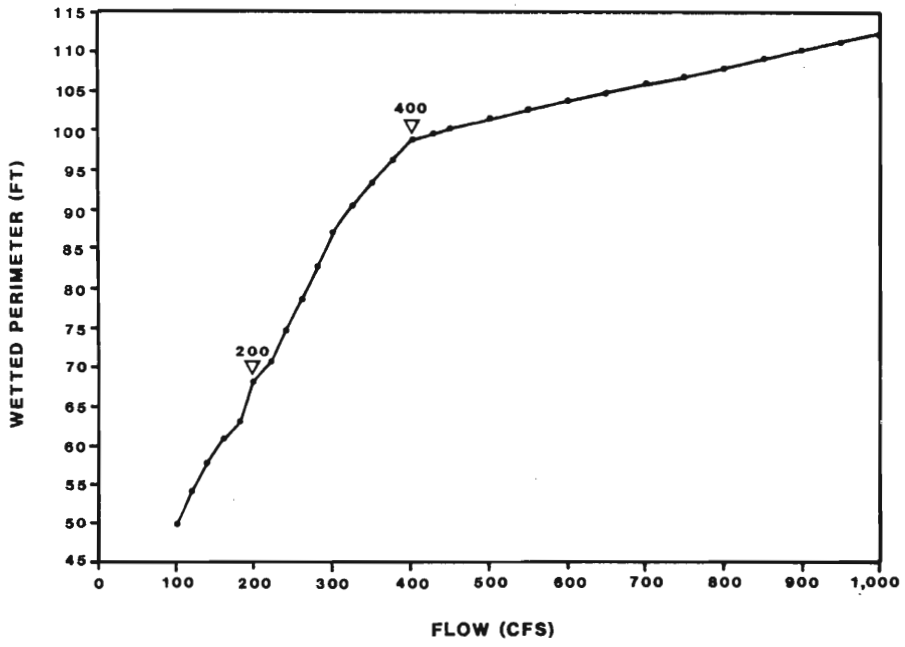


FIGURE A-3. The Clark Fork near Bearmouth.

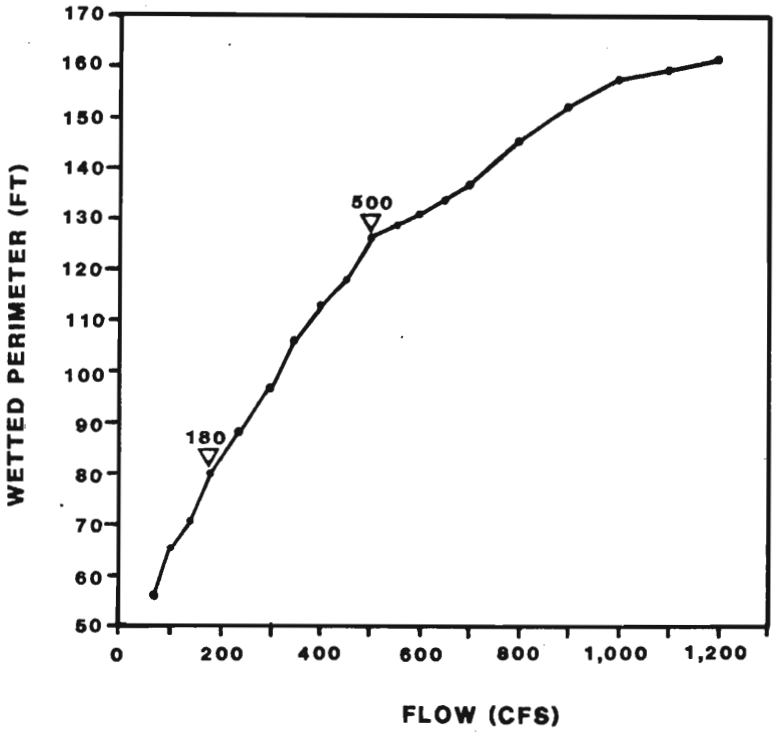


FIGURE A-4. The Clark Fork near Turah.

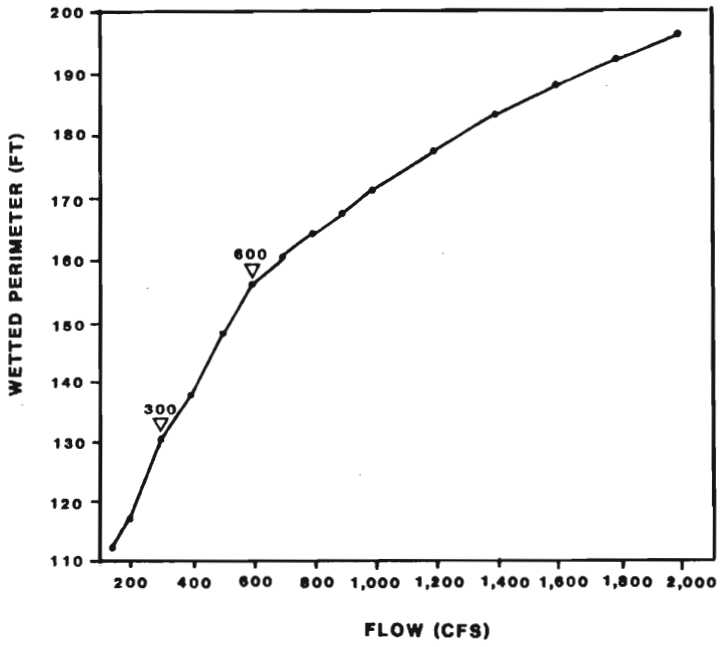


FIGURE A-5. Warm Springs Creek near Meyers Dam.

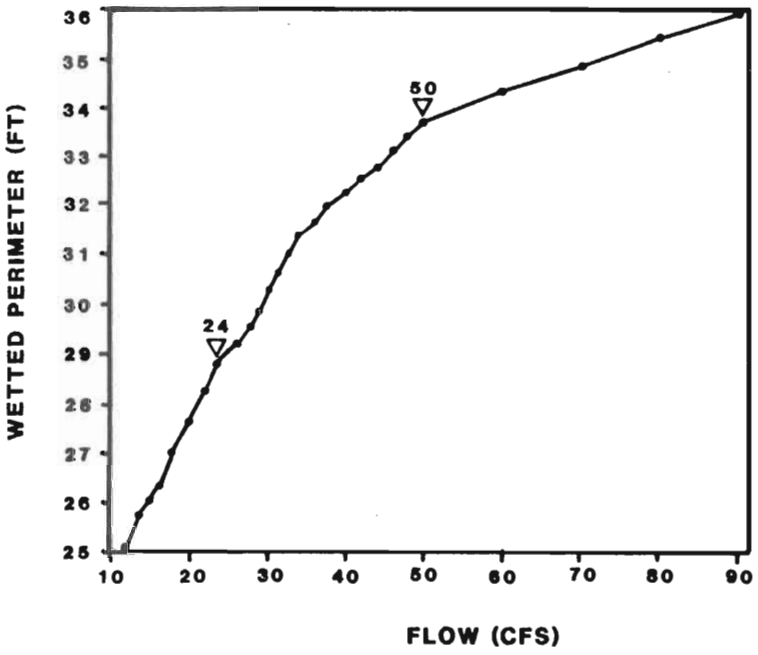


FIGURE A-6. Warm Springs Creek near mouth.

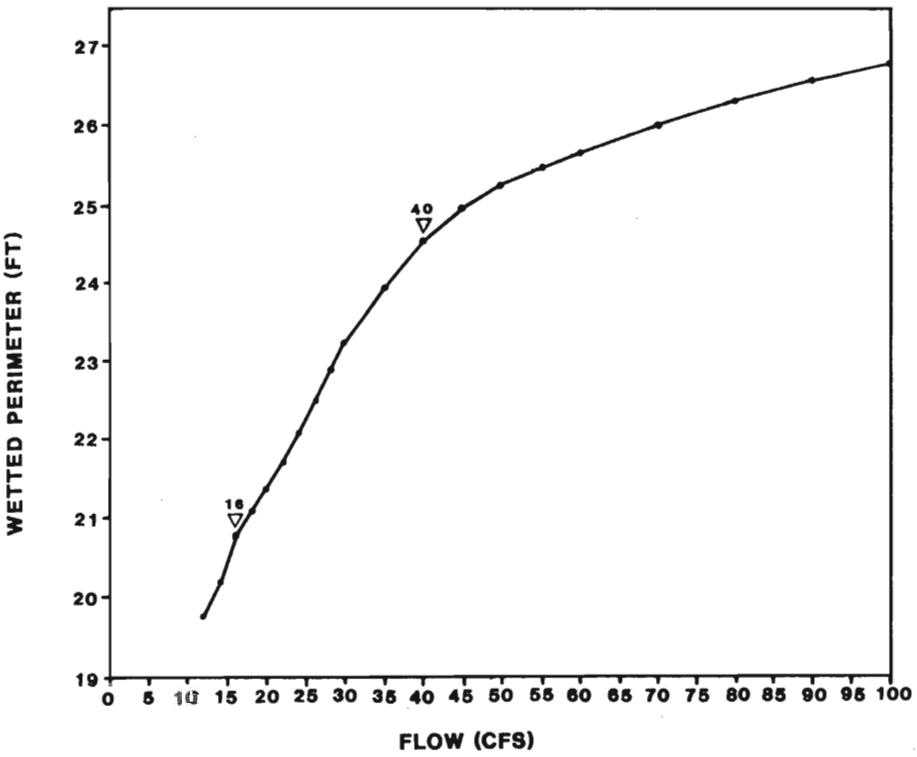


FIGURE A-7. Barker Creek.

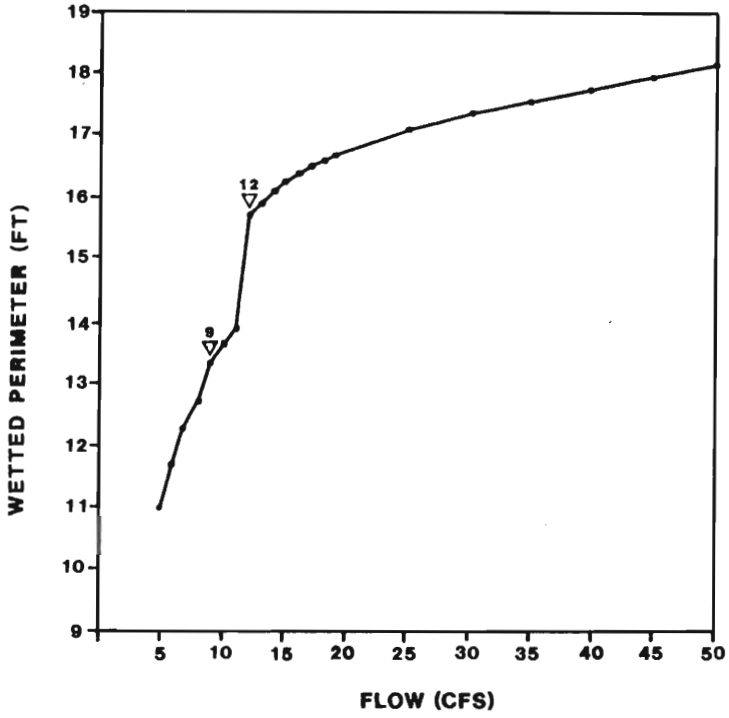


FIGURE A-8. Storm Lake Creek.

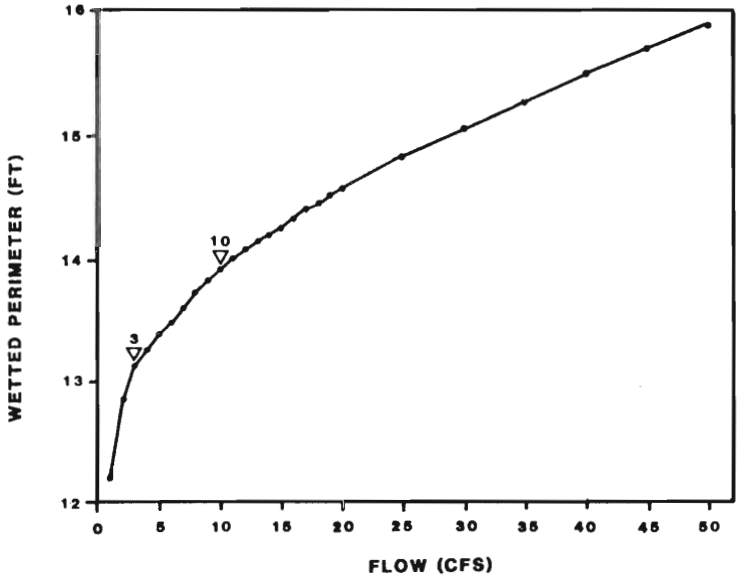


FIGURE A-9. Twin Lakes Creek.

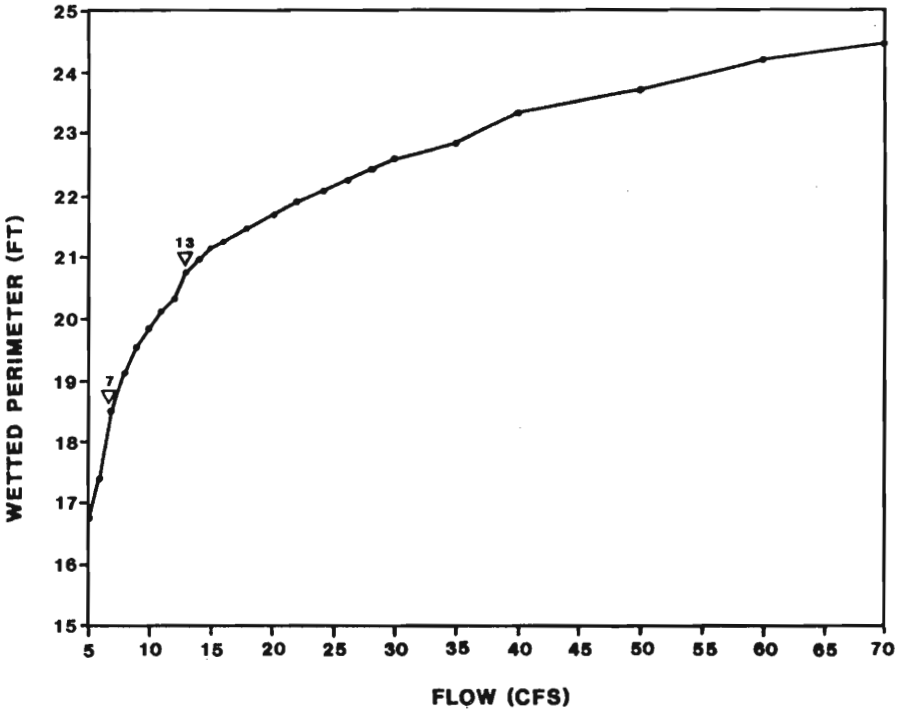


FIGURE A-10. Lost Creek.

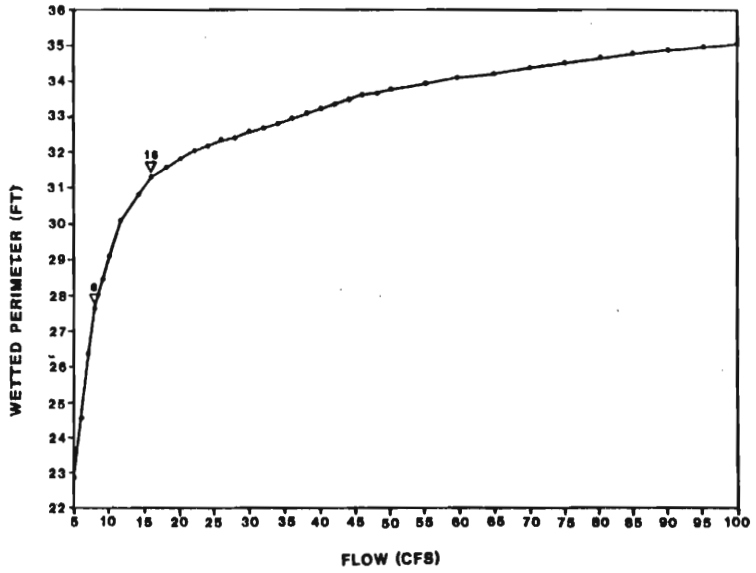


FIGURE A-11. Racetrack Creek near the Deerlodge Forest boundary.

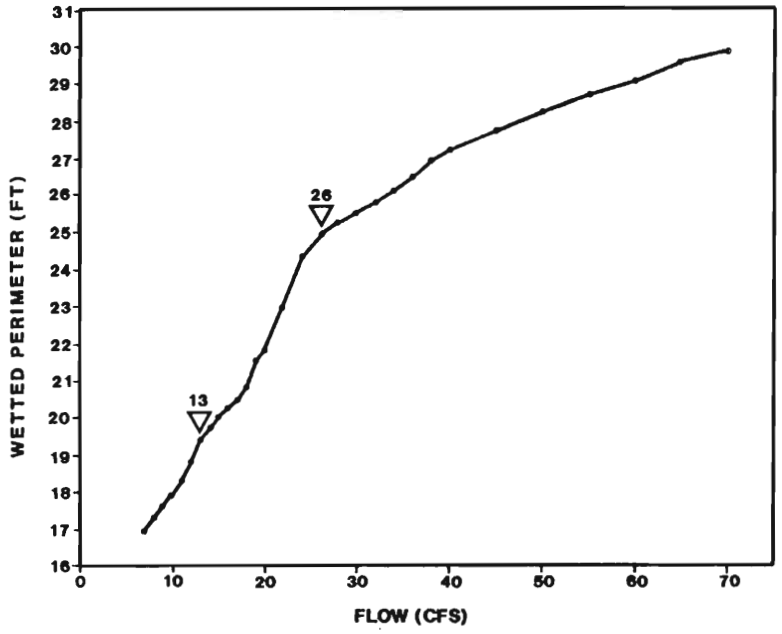


FIGURE A-12. Racetrack Creek near mouth.

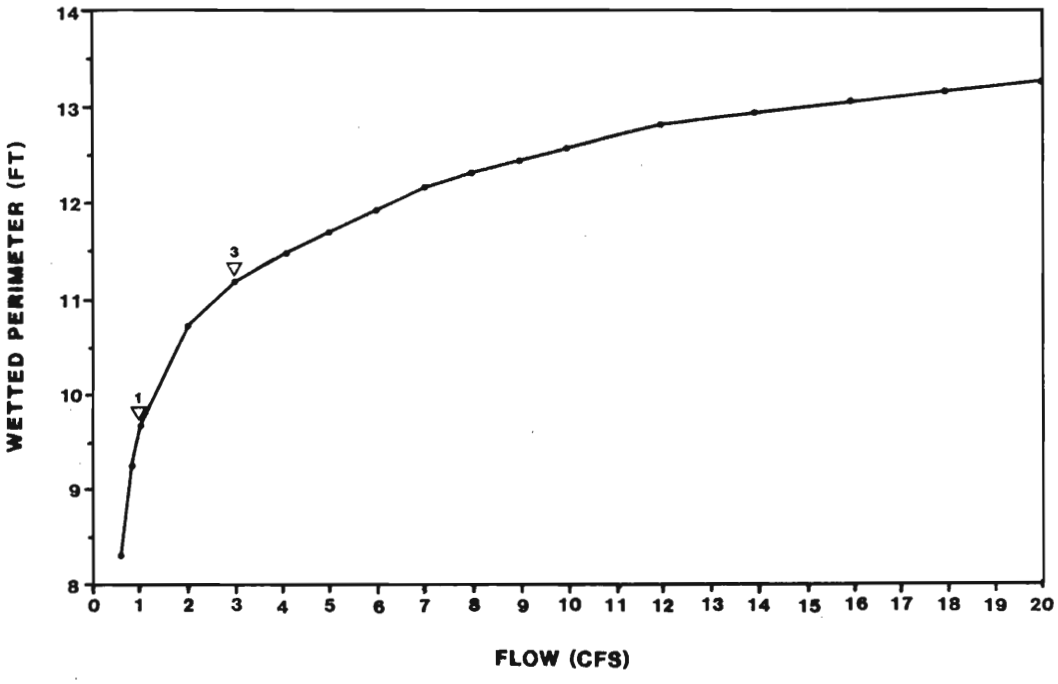


FIGURE A-13. Dempsey Creek.

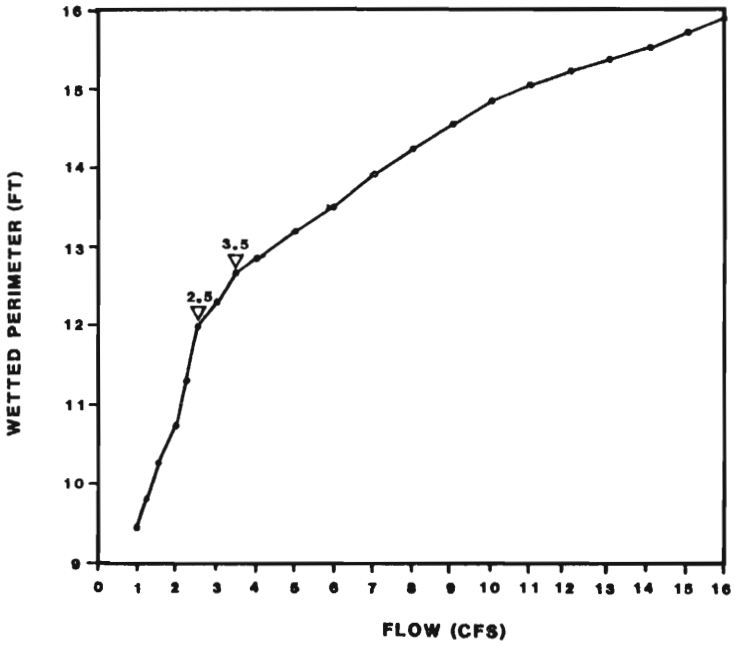


FIGURE A-14. The Little Blackfoot River above Dog Creek.

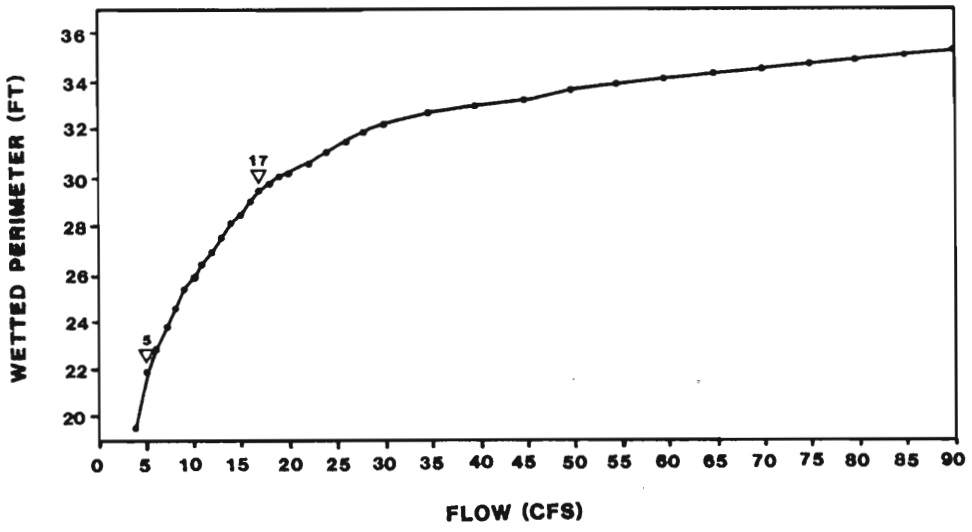


FIGURE A-15. The Little Blackfoot River near mouth.

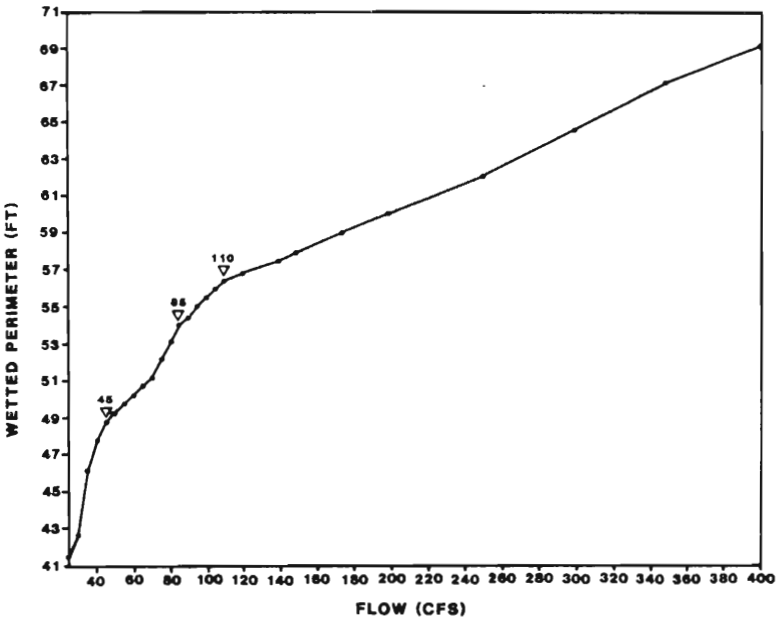


FIGURE A-16. Snowshoe Creek.

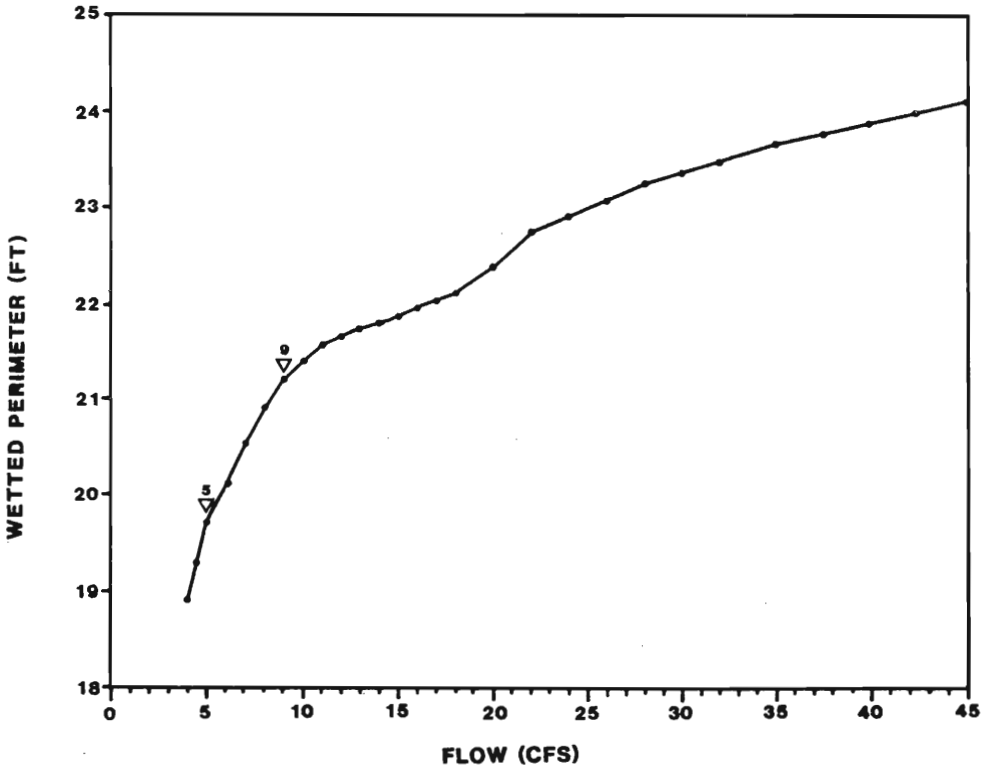


FIGURE A-17. Dog Creek.

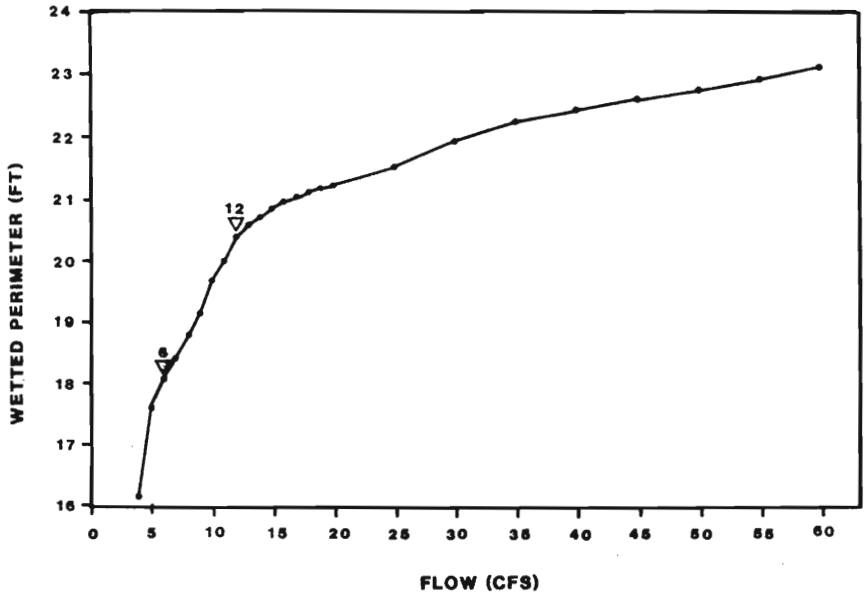


FIGURE A-18. Gold Creek.

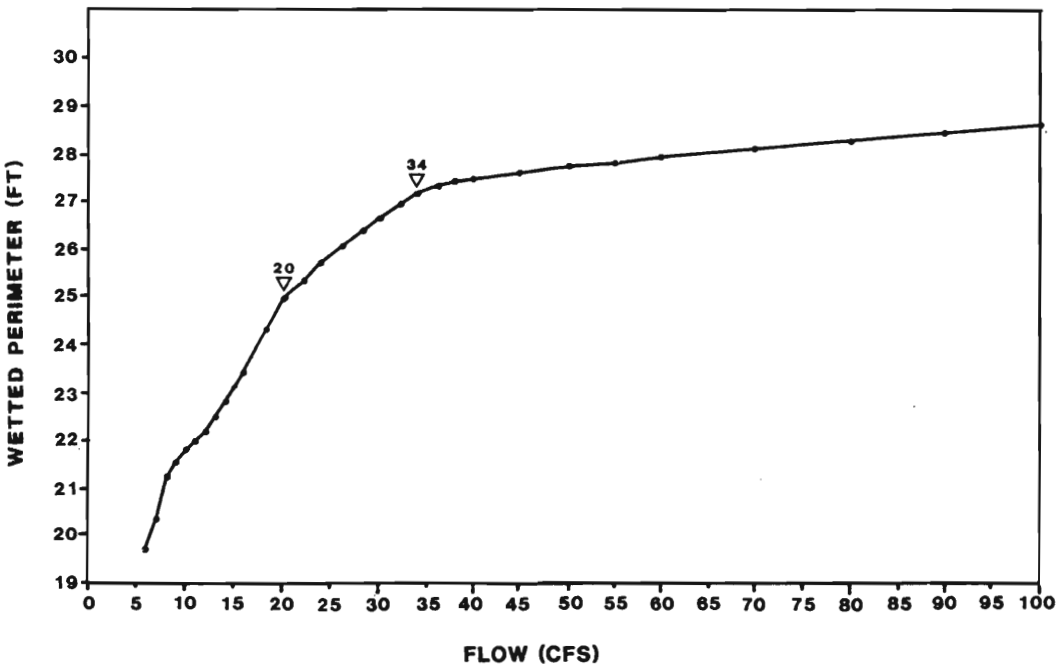


FIGURE A-19. Flint Creek above Boulder Creek.

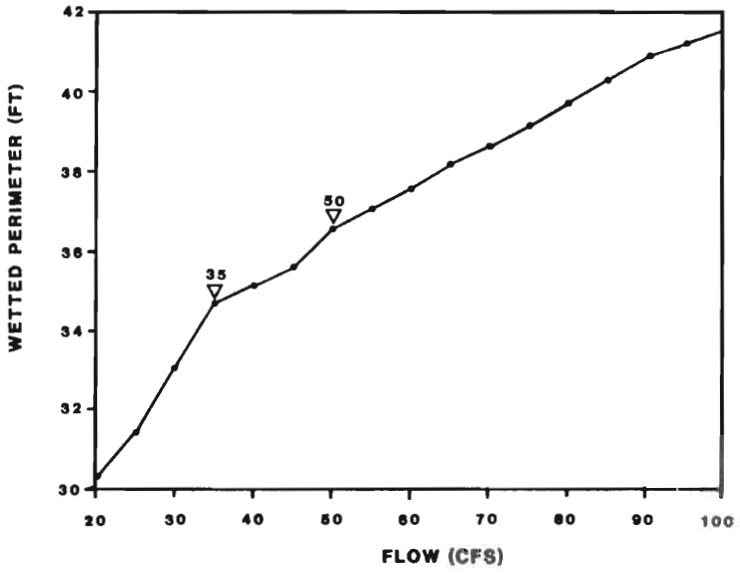


FIGURE A-20. Flint Creek near mouth.

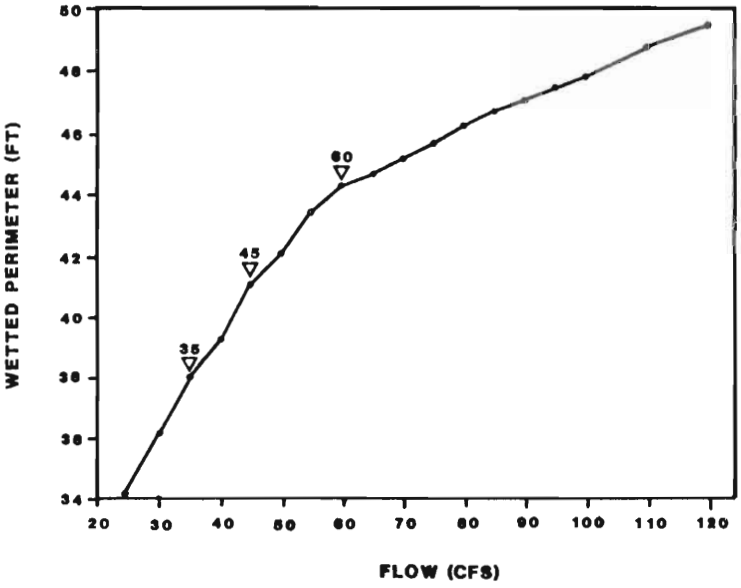


FIGURE A-21. Boulder Creek.

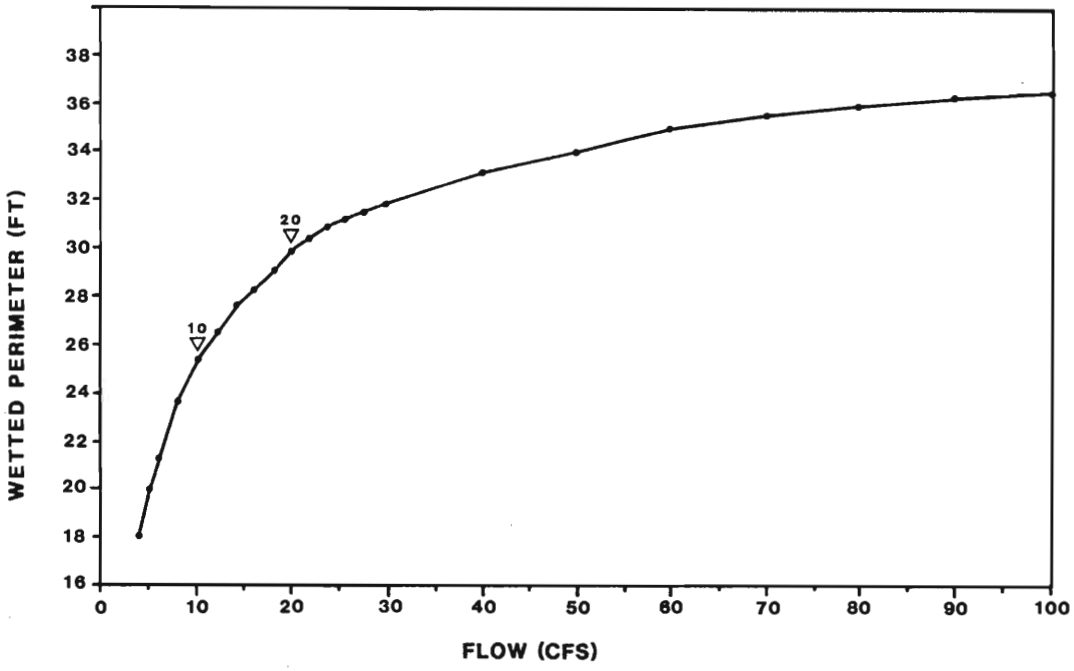


FIGURE A-22. North Fork of Flint Creek.

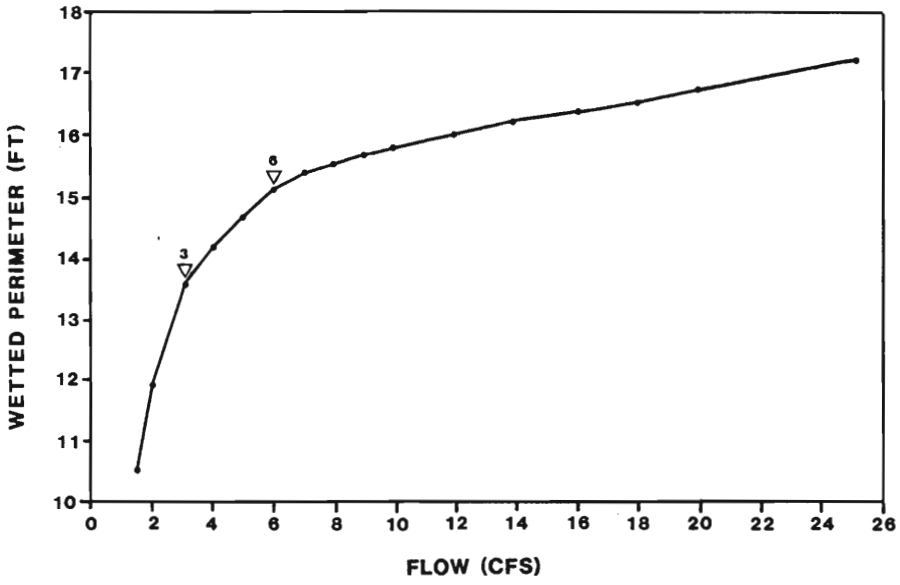
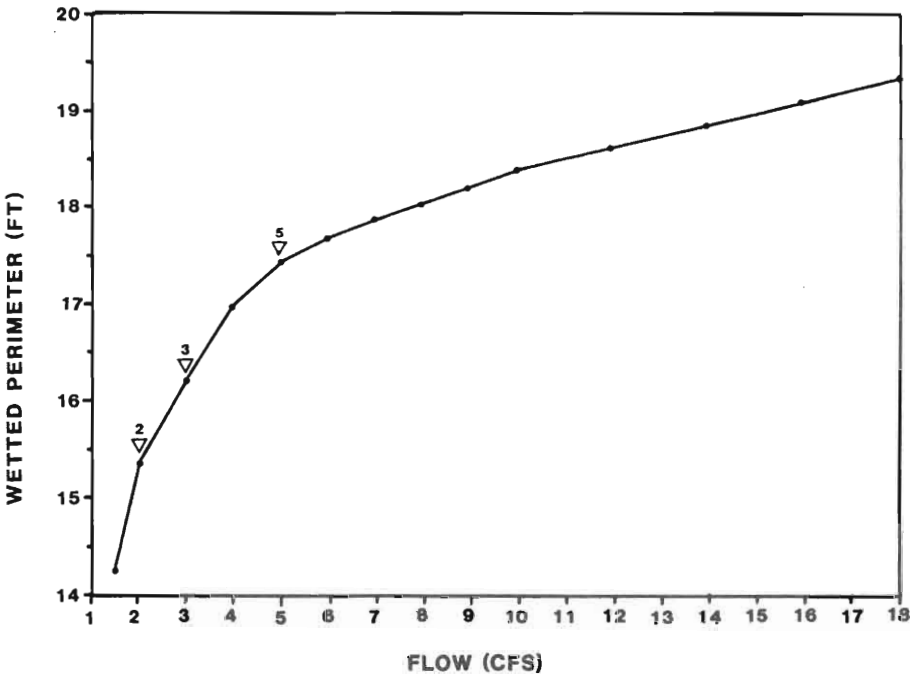


FIGURE A-23. Harvey Creek.



Appendix B
Water Quality Data
for Upper Clark Fork Tributaries

Appendix B. Water Quality Data for Upper Clark Fork Tributaries (Source: DHES 1989, USGS 1988, 1989, 1990).
All values in mg/L

Date	Total Nitrogen	Total Phos-phorous	TR[a] Arsenic	TR Cadmium	TR Copper	TR Iron	TR Lead	TR Zinc	Hardness	Total Sulfate	Flow (cfs)
					DEMPSEY CREEK = SUMMER						
09/29/78	--	<0.010	0.001	<0.001	<0.01	0.04	0.005	<0.005	--	6.8	5.0
07/15/75	0.08	0.055	--	--	--	--	--	--	--	--	
					DEMPSEY CREEK = FALL						
11/16/78	0.47	0.03	--	--	<0.01	--	--	0.008	--	42.8	9.1
					DEMPSEY CREEK = WINTER						
03/14/79	0.21	0.05	--	--	--	--	--	--	187	38.4	15.3
					FLINT CREEK NEAR NEW CHICAGO = SPRING						
04/18/79	<0.01	0.09	--	--	--	--	--	--	146	17.3	166
05/10/79	0.04	0.07	--	--	--	--	--	--	126	16.6	--
06/14/79	0.01	0.06	--	--	--	--	--	--	139	12.4	--
04/25/84	--	--	--	--	<0.01	0.49	--	0.04	--	--	--
05/08/84	--	--	--	--	<0.01	0.30	--	0.12	--	--	100.9
05/15/84	--	--	--	--	0.03	1.66	--	0.26	--	--	325
05/22/84	--	--	--	--	<0.01	0.41	--	0.03	--	--	270
05/30/84	--	--	--	--	<0.01	0.65	--	0.08	--	--	284
06/05/84	--	--	--	--	<0.01	0.34	--	0.03	98	--	305
06/12/84	--	--	--	--	<0.01	0.32	--	0.02	110	--	339
06/19/84	--	--	--	--	<0.01	0.21	--	0.03	89	--	325
06/27/84	--	--	--	--	<0.01	0.34	--	0.03	91	--	--
04/15/86	--	--	--	<0.001	0.009	0.60	0.009	0.006	110	--	214
05/28/86	--	--	--	<0.001	0.015	--	--	--	60		386
04/20/88	--	--	0.019[b]	0.001	0.013	1.0	0.013	0.050	130	--	114
04/29/87	--	--	0.018[b]	<0.001	0.010	1.3	0.016	0.050	92	--	102
05/27/87	--	--	0.031[b]	<0.001	0.016	2.3	<0.005	0.110	180	--	101
04/06/89	--	--	0.037[b]	0.001	0.023	4.8	0.043	0.170	110	--	295
04/20/89	--	--	0.018[b]	<0.001	0.007	1.3	0.012	0.030	130	--	208
05/07/89	--	--	0.017[b]	<0.001	0.010	1.1	0.014	0.040	97	--	80
05/11/89	--	--	0.021[b]	<0.001	0.012	1.5	0.023	0.070	73	--	100

Date	Total Nigrogen	Total Phos-phorous	TR[a] Arsenic	TR Cadmium	TR Copper	TR Iron	TR Lead	TR Zinc	Hardness	Total Sulfate	Flow (cfs)
FLINT CREEK NEAR NEW CHICAGO = SUMMER											
08/22/78	0.05	0.127	--	<0.005	<0.01	--	--	0.017	--	32.0	105
08/24/78	--	--	--	--	--	--	--	--	--	30.0	113
08/22/79	0.02	0.105	--	--	--	--	--	--	--	--	30.84
09/19/79	<0.01	0.060	--	--	--	--	--	--	218	34.9	89
07/03/84	--	--	--	--	<0.01	0.22	--	0.040	117	--	205
07/16/84	--	--	--	--	<0.01	0.12	--	0.010	160	--	--
08/08/84	--	--	--	--	--	--	--	--	--	--	--
07/11/87	--	--	0.016[b]	<0.001	0.008	0.510	0.014	0.030	210	--	93
07/19/87	--	--	0.015[b]	<0.001	0.007	0.480	<0.005	0.030	200	--	151
09/02/87	--	--	0.013[b]	<0.001	0.007	0.190	<0.005	<0.10	260	--	7.6
08/15/89	--	--	0.012[b]	<0.001	0.004	0.240	0.002	0.010	240	--	31
FLINT CREEK NEAR NEW CHICAGO = FALL											
10/06/78	--	--	--	--	--	--	--	--	--	25.0	249
11/16/78	0.16	0.03	--	--	<0.01	--	--	0.01	--	22.5	157.6
10/24/79	0.02	0.05	--	--	--	--	--	--	179	25.6	152
11/20/79	0.13	0.04	--	--	--	--	--	--	172	19.4	117
FLINT CREEK NEAR NEW CHICAGO = WINTER											
03/27/74	--	--	--	<0.01	0.01	1.5	--	0.09	119	22.5	175
02/22/79	0.20	0.13	--	--	--	--	--	--	153	16.4	--
03/15/79	0.10	0.09	--	--	--	--	--	--	153	19.5	160
01/31/80	0.35	0.05	--	--	--	--	--	--	--	24.2	--
02/25/86	--	--	--	<0.0001	0.029	4.70	0.056	0.170	--	--	892
03/11/89	--	--	0.013[b]	<0.0001	0.032	7.20	0.087	0.290	75	--	602

Date	Total Nitrogen	Total Phos-phorous	TR[a] Arsenic	TR Cadmium	TR Copper	TR Iron	TR Lead	TR Zinc	Hardness	Total Sulfate	Flow (cfs)
LITTLE BLACKFOOT NEAR MOUTH = SPRING											
05/06/74	--	--	0.004	<0.001	<0.01	0.72	--	<0.010	90	21.5	418
04/19/78	0.03	0.027	--	--	--	--	--	--	--	22.0	--
05/24/78	0.03	0.133	--	--	--	--	--	--	--	18.7	1060
06/20/78	0.04	0.026	--	--	--	--	--	--	--	19.0	318
04/03/84	--	--	--	--	<0.01	0.09	--	<0.005	--	--	91.3
04/10/84	--	--	--	--	0.02	0.18	--	0.005	--	--	136
04/17/84	--	--	--	--	<0.01	1.58	--	0.020	--	--	369
04/25/84	--	--	--	--	<0.01	0.23	--	0.007	--	--	377
04/30/84	--	--	--	--	<0.01	0.16	--	<0.005	--	--	278
05/08/84	--	--	--	--	<0.01	0.13	--	<0.005	--	--	254
05/15/84	--	--	--	--	0.01	2.02	--	0.040	--	--	--
05/22/84	--	--	--	--	<0.01	0.32	--	<0.005	--	--	724
05/30/84	--	--	--	--	<0.01	0.19	--	<0.005	--	--	509
06/05/84	--	--	--	--	<0.01	0.15	--	<0.005	102	--	543
06/12/84	--	--	--	--	<0.01	0.33	--	0.007	93	--	681
06/19/84	--	--	--	--	<0.01	0.08	--	<0.005	101	--	381
06/27/84	--	--	--	--	<0.01	0.08	--	<0.005	105	--	293
04/06/89	--	--	0.008[b]	<0.001	0.009	3.00	<0.005	0.030	63	--	562
04/07/89	--	--	0.015[b]	0.001	0.045	25.00	0.021	0.011	51	--	2080
04/20/89	--	--	0.007[b]	<0.001	0.012	1.90	<0.005	0.010	90	--	433
05/07/89	--	--	0.008[b]	<0.001	0.005	0.72	0.003	0.020	70	--	626
05/27/87	--	--	0.006[b]	<0.001	0.014	0.19	<0.005	0.020	110	--	170
04/21/88	--	--	0.006[b]	<0.001	0.005	0.33	<0.005	0.020	100	--	160
05/16/88	--	--	0.006[b]	<0.001	0.005	0.38	<0.005	<0.010	86	--	348
LITTLE BLACKFOOT NEAR MOUTH = SUMMER											
08/01/74	--	--	--	--	--	--	--	--	163	20.0	51.3
07/24/78	<0.01	0.043	--	--	--	--	--	--	--	16.3	140
08/22/78	<0.01	0.038	--	<0.005	<0.01	--	--	<0.005	--	16.6	68
08/24/78	--	--	--	--	--	--	--	--	--	20.0	82.2
09/13/78	<0.01	0.040	--	--	--	--	--	--	--	16.2	165
07/03/84	--	--	--	--	<0.01	0.06	--	<0.005	11	--	183
07/16/84	--	--	--	--	<0.01	0.04	--	0.005	119	--	--
08/15/89	--	--	0.007[b]	<0.001	0.003	0.070	0.001	<0.003	130	--	35
07/10/87	--	--	0.005[b]	<0.001	0.003	0.120	0.018	<0.010	130	--	84
LITTLE BLACKFOOT NEAR MOUTH = FALL											
10/06/78	--	--	--	--	--	--	--	--	--	22.5	110
09/02/87	--	--	0.005b[b]	<0.001	0.007	0.050	0.006	<0.010	140	--	37
LITTLE BLACKFOOT NEAR MOUTH = WINTER											
03/26/74	--	--	--	<0.010	0.01	0.20	--	0.010	134	32.0	94.6
03/11/89	--	--	0.006[b]	0.001	0.010	2.10	<0.005	0.030	63	--	495
04/29/89	--	--	0.006[b]	0.001	0.009	0.56	<0.005	0.010	81	--	216

Date	Total Nitrogen	Total Phos-phorous	TR[a] Arsenic	TR Cadmium	TR Copper	TR Iron	TR Lead	TR Zinc	Hardness	Total Sulfate	Flow (cfs)
						GOLD CREEK = SPRING					
04/19/78	0.11	0.074	--	--	--	--	--	--	--	74.0	20
05/24/78	0.03	0.110	--	--	--	--	--	--	--	50.4	--
04/18/79	0.01	0.120	--	--	--	--	--	--	568	73.7	24.9
05/09/79	0.02	0.080	--	--	--	--	--	--	211	61.8	--
06/14/79	0.01	0.110	--	--	--	--	--	--	163	39.6	--
						GOLD CREEK = SUMMER					
09/29/75	0.04	0.019	--	<0.001	--	0.08	--	<0.01	83	12.0	17.6
08/23/78	0.01	0.150	--	--	--	--	--	--	--	8.2	27
07/19/79	0.01	0.190	--	--	--	--	--	--	218	56.7	--
08/09/79	0.01	0.130	--	--	--	--	--	--	221	55.2	15.83
08/22/79	<0.01	0.120	--	--	--	--	--	--	--	--	13.37
09/19/79	<0.01	0.100	--	--	--	--	--	--	209	16.7	17
						GOLD CREEK = FALL					
11/15/78	0.03	0.06	--	--	0.01	--	--	<0.005	--	49.4	26.61
10/24/79	0.01	0.06	--	--	--	--	--	--	193	50.8	15.0
11/20/79	0.02	0.07	--	--	--	--	--	--	205	43.8	16.43
						GOLD CREEK = WINTER					
02/22/79	0.04	0.07	--	<0.001	<0.01	0.02	--	<0.005	223	48.9	--
03/15/79	<0.01	0.13	--	--	--	--	--	--	191	62.6	28
01/31/80	0.08	0.07	--	--	--	--	--	--	--	35.6	--
						LOST CREEK = SUMMER					
08/24/78	--	--	--	--	--	--	--	--	--	160.0	29.3
09/13/78	--	<0.01	0.007	<0.001	<0.01	0.07	<0.005	--	14.3	5	
						LOST CREEK = FALL					
10/05/78	--	--	--	--	--	--	--	--	--	188.0	52.8
11/16/78	0.6	0.01	--	--	0.01	--	--	0.005	--	123.0	50
						LOST CREEK = WINTER					
3/15/79	0.45	0.03	--	--	--	--	--	--	316	138.0	67

Date	Total Nitrogen	Total Phos-phorous	TR[a] Arsenic	TR Cadmium	TR Copper	TR Iron	TR Lead	TR Zinc	Hardness	Total Sulfate	Flow (cfs)
					RACETRACK CREEK NEAR MOUTH = SPRING						
04/18/86	--	--	--	--	<0.01	--	--	<0.005	--	--	--
04/25/86	--	--	--	--	<0.01	--	--	0.008	--	--	--
05/05/86	--	--	--	--	<0.01	--	--	<0.005	--	--	--
05/12/86	--	--	--	--	<0.01	--	--	0.005	--	--	--
05/19/86	--	--	--	--	<0.01	--	--	<0.005	--	--	--
05/26/86	--	--	--	--	<0.01	--	--	0.010	--	--	--
05/28/86	--	--	--	--	<0.01	--	--	0.015	--	--	--
05/30/86	--	--	--	--	<0.01	--	--	0.007	--	--	--
06/02/86	--	--	--	--	<0.01	--	--	0.006	--	--	--
06/04/86	--	--	--	--	0.01	--	--	0.008	--	--	--
06/06/86	--	--	--	--	<0.01	--	--	0.012	--	--	--
06/16/86	--	--	--	--	<0.01	--	--	0.005	--	--	--
06/23/86	--	--	--	--	<0.01	--	--	0.010	--	--	--
05/06/87	--	--	--	--	<0.01	--	--	0.017	--	--	--
05/13/87	--	--	--	--	<0.01	--	--	0.012	--	--	--
05/20/87	--	--	--	--	<0.01	--	--	0.016	--	--	--
05/27/87	--	--	--	--	<0.01	--	--	0.011	--	--	--
06/03/87	--	--	--	--	<0.01	--	--	0.006	--	--	--
06/10/87	--	--	--	--	<0.01	--	--	0.008	--	--	--
06/17/87	--	--	--	--	<0.01	--	--	0.024	--	--	--
06/24/87	--	--	--	--	<0.01	--	--	0.006	--	--	--
06/29/87	--	--	--	--	0.01	--	--	0.009	--	--	--
					RACETRACK CREEK NEAR MOUTH = FALL						
10/05/78	--	--	--	--	--	--	--	--	--	54.7	36.2
11/16/78	0.11	<0.01	--	--	<0.01	--	--	0.005	--	9.9	18.6
					RACETRACK CREEK NEAR MOUTH = WINTER						
03/15/79	0.09	<0.01	--	--	--	--	--	--	81	9.2	26.2

Date	Total Nigrogen	Total Phos-phorous	TR[a] Arsenic	TR Cadmium	TR Copper	TR Iron	TR Lead	TR Zinc	Hardness	Total Sulfate	Flow (cfs)
WARM SPRINGS CREEK AT MOUTH = SPRING											
05/12/80	0.130	0.027	--	--	0.02	0.20	--	0.010	223	107.0	--
05/27/80	--	--	--	--	0.02	0.13	--	0.010	--	--	--
04/28/83	--	--	--	<0.005	0.01	--	--	0.010	--	90.0	58.9
05/31/83	--	--	--	0.005	0.05	--	--	0.020	--	25.0	296
06/30/83	--	--	--	<0.005	0.01	--	--	<0.005	--	30.0	162
04/30/84	--	--	--	--	<0.01	0.07	--	0.008	--	96.0	66
05/30/84	--	--	--	--	0.04	0.56	--	0.020	--	35.0	198
06/27/84	--	--	--	--	0.06	0.33	--	0.020	--	21.0	360
04/22/85	--	--	0.003	<0.005	<0.01	0.04	--	0.005	230	98.7	58
05/07/85	--	--	0.004	<0.005	<0.01	0.06	--	<0.005	156	56.7	104
05/30/85	--	--	0.005	<0.005	0.01	0.07	--	<0.005	155	59.0	127
06/27/85	--	--	0.006	<0.005	<0.01	0.02	--	<0.005	640	501.0	0.98
04/07/86	0.080	0.016	0.004	--	<0.01	--	--	<0.005	235	--	50.3
04/21/86	0.030	0.011	0.004	--	<0.01	--	--	0.005	231	--	56
05/05/86	0.036	0.020	0.003	--	<0.01	--	--	<0.005	195	--	62
05/19/86	0.030	0.011	0.004	--	<0.01	--	--	0.006	245	--	46
06/02/86	0.010	0.045	0.010	--	0.03	--	--	0.021	73	--	315
06/16/86	0.060	0.011	0.004	--	0.01	--	--	0.006	136	--	77.9
06/30/86	0.100	0.008	0.006	--	<0.01	--	--	0.007	274	--	21.6
04/06/87	0.130	0.011	0.004	--	<0.01	--	--	<0.005	301	--	22.7
04/21/87	0.080	0.007	0.004	--	<0.01	--	--	0.006	287	--	27.7
05/05/87	0.070	0.012	0.004	--	0.01	--	--	0.006	217	--	31
05/18/87	0.130	0.011	0.004	--	<0.01	--	--	0.009	379	--	9.3
06/03/87	0.080	0.021	0.004	--	<0.01	--	--	0.007	295	--	9.2
06/22/87	0.060	0.022	0.006	--	<0.01	--	--	<0.005	465	--	0.8
WARM SPRINGS CREEK AT MOUTH = SUMMER											
07/14/76	0.04	0.031	--	<0.001	0.01	--	--	<0.010	--	--	108.74
07/21/77	0.26	0.009	--	<0.001	0.01	--	--	<0.010	--	--	4.33
08/02/77	0.55	0.036	--	--	--	--	--	--	--	--	0.8
08/09/77	0.17	0.020	--	<0.001	0.01	--	--	<0.010	--	--	1.52
08/22/77	0.11	0.056	--	--	--	--	--	--	--	--	0.1
08/29/77	0.57	0.006	--	--	--	--	--	--	--	--	3.12
09/12/77	0.34	0.004	--	--	--	--	--	--	--	--	5.15
09/18/77	0.39	0.004	--	<0.001	<0.01	--	--	<0.010	--	--	8.83
08/22/78	--	--	--	<0.005	0.01	--	--	0.017	--	449.0	390
08/24/78	--	--	--	--	--	--	--	--	--	460.0	1.09
07/28/83	--	--	--	<0.005	<0.01	--	--	0.020	--	215.0	12.2
08/30/83	--	--	--	<0.005	<0.01	--	--	<0.005	--	98.0	38.8
09/30/83	--	--	--	0.005	<0.01	--	--	0.005	--	64.0	74.8
07/27/84	--	--	--	--	0.02	0.03	--	0.005	--	179.0	32
08/30/84	--	--	--	--	<0.01	0.03	--	<0.005	--	247.0	27
09/28/84	--	--	--	--	<0.01	0.04	--	0.100	--	127.0	35

Date	Total Nigrogen	Total Phos-phorous	TR[a] Arsenic	TR Cadmium	TR Copper	TR Iron	TR Lead	TR Zinc	Hardness	Total Sulfate	Flow (cfs)
					WARM SPRINGS CREEK AT MOUTH = SUMMER (cont'd)						
07/24/85	--	--	0.010	<0.005	<0.01	0.02	--	<0.005	742	570.0	0.6
08/29/85	--	--	0.010	<0.005	<0.01	0.05	--	<0.005	715	523.0	6.2
09/24/85	0.06	0.009	0.005	<0.005	<0.01	--	--	<0.005	219	--	81
07/14/86	0.12	0.006	0.005	--	<0.01	--	--	<0.005	311	--	16.4
08/12/86	0.08	0.011	0.010	--	<0.01	--	--	<0.005	717	--	3.3
09/09/86	0.07	0.018	0.007	--	0.01	--	--	0.009	222	--	49.1
07/07/87	<0.01	0.009	0.010	--	<0.01	--	--	<0.005	579	--	0.2
07/27/87	0.01	0.018	0.014	--	<0.01	--	--	<0.005	474	--	0.1
					WARM SPRINGS CREEK NEAR MOUTH = FALL						
10/05/78	--	--	--	--	--	--	--	--	--	96.7	56
11/15/78	--	--	--	--	0.01	--	--	<0.005	--	207.0	31.9
11/19/80	0.23	0.008	--	--	--	--	--	--	--	--	--
10/31/83	--	--	--	<0.005	<0.01	--	--	<0.005	--	69.0	77
11/30/83	--	--	--	0.005	<0.01	--	--	<0.005	--	85.0	60.5
12/28/83	--	--	--	0.005	<0.01	--	--	0.008	--	250.0	11
10/27/84	--	--	--	--	<0.01	0.05	--	<0.005	--	86.0	70
11/28/84	--	--	--	--	0.07	0.90	--	0.050	--	70.0	77.9
12/28/84	--	--	--	--	<0.01	0.07	--	0.022	--	76.0	69.8
10/28/85	0.03	0.004	0.003	<0.005	<0.01	--	--	<0.005	172	--	57.3
12/10/85	0.14	0.009	0.004	<0.005	<0.01	--	--	<0.005	220	--	--
10/14/86	0.07	0.001	0.004	---	<0.01	--	--	0.005	262	--	32.3
11/12/86	0.17	0.008	0.006	--	<0.01	--	--	0.006	309	--	33.6
12/09/86	0.15	0.005	0.004	--	<0.01	--	--	<0.005	274	--	28.7
					WARM SPRINGS CREEK AT MOUTH = WINTER						
03/15/79	0.22	0.020	--	--	--	--	--	--	338	192.0	42.1
01/26/83	--	--	--	<0.005	<0.01	--	--	<0.005	--	79.0	62.7
02/17/83	--	--	--	0.006	0.02	--	--	0.008	--	78.0	68
03/30/83	--	--	--	<0.005	0.01	--	--	<0.005	--	111.0	44.9
01/31/84	--	--	--	<0.005	0.01	--	--	0.006	--	54.0	83.6
02/24/84	--	--	--	<0.005	0.01	--	--	0.020	--	74.0	66.8
03/29/84	--	--	--	--	0.01	0.07	--	0.005	--	100.0	54.8
01/30/85	--	--	--	--	<0.01	0.02	--	<0.005	--	102.0	--
02/25/85	--	--	--	--	<0.01	0.03	--	0.005	--	135.0	46.7
03/27/85	--	--	--	--	<0.01	0.04	--	0.005	--	125.0	46.5
01/06/86	0.11	0.010	0.002	<0.005	<0.01	--	--	<0.005	196	--	57.5
02/04/86	0.10	0.010	0.003	<0.005	<0.01	--	--	<0.005	248	--	46.6
02/25/86	--	--	0.018	<0.005	0.04	--	--	0.005	208	--	--
03/10/86	0.14	0.013	0.004	--	<0.01	--	--	<0.005	245	--	52
01/12/87	0.14	0.004	0.003	--	<0.01	--	--	0.005	227	--	47
02/09/87	0.16	0.003	0.003	--	<0.01	--	--	0.007	337	--	24.1
03/09/87	0.18	<0.001	0.003	--	<0.01	--	--	<0.005	338	--	21.6

[a]TR = total recoverable. [b]= total arsenic

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ERRATA

Errors in the draft EIS and addendum have been corrected as indicated in the following list. A broken line through text ~~like this~~ indicates deletions, and additions are shown in *italics*.

CORRECTIONS TO THE DRAFT EIS

Page		
3	4th ¶	The Department of Agriculture ~~(USDA)~~
7	center of map	Phil~~l~~ipsburg
15	Table 3-1	No~~t~~*v*
24	Figure 4-1	Water Works in the Flint Creek *and Warm Springs* Drainages
41	2nd ¶	historic*al*
46	9th ¶	governments
51	Table 5-2	main-stem delete excess underline in header On Reach 2, one-half the average flow of record is ~~300~~ *330* cfs based on the gauge at Gold Creek....
53	4th ¶	~~diversing~~ *diversion*
54	6th ¶	~~their~~ *its*
56	4th ¶	~~standards for nutrient-inducing discharges~~ *standards for discharges containing nutrients*
56	5th ¶	not protect ~~protect~~ flows above
58	6th ¶	historic*al*
59	1st ¶	historic*al*
63	2nd ¶	of ~~the Granite County~~ *GCD's* proposal
63	8th ¶	Highway ~~10A~~ *1*
64	3rd ¶	than ~~that~~ *those* requested by DFWP
64	6th ¶	"In the case of game fish, a *poor* sport fishery could still be provided."
65	Table 5-5	Revised. See Chapter Two in this final EIS.
68	1st and 6th ¶	upper Clark Fork ~~B~~*b*asin
75	5th ¶	If the reservation*s* were not....
76	4th ¶	either the demand *for* or the cost of
76	6th ¶	~~ground water~~ *groundwater*
76	7th ¶	~~L~~*l*egislature
84	(e)Case 2	There ~~is~~ *are* no significant....
86	Option 3	...but give DFWP priority *over* GCD.
144	Table C-1	treatment ponds ~~has~~ *have* developed
151	Table D-5	Minimum recorded (mg/l)

CORRECTIONS TO THE ADDENDUM

Page		
vi	last line	Washington Water ~~and~~ Power
1	5th ¶	and April 1, ~~1989~~ *1987*
4	4th ¶	would store ~~-water~~ *water*
15	2nd ¶	The average *annual* volume
26	1st ¶	recreational use in the *f*all
32	3rd ¶	are addressed *in* this chapter
34	1st line	and ~~30,000~~ *37,200* acres in the upper Clark Fork basin
45	4th ¶	flows *in* the Clark Fork
48	2nd ¶	approximately ~~34~~ *33* miles
62	6th ¶	arsenic loads ~~a~~ *in* Boulder Creek
89	DHES	Sciences~~)~~

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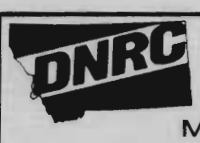

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